

ENVIRONMENTAL ASSESSMENT

Integrated Wildlife Damage Management to Reduce Cervid Damage in Wisconsin



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In Cooperation With

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ACRONYMS

APHIS	Animal and Plant Health Inspection Service
AVMA	American Veterinary Medical Association
BO	Biological Opinion
CDFG	California Department of Fish and Game
CEQ	Council on Environmental quality
CFR	Code of Federal Regulations
CWD	Chronic Wasting Disease
DMU	Deer Management Unit
EA	Environmental Assessment
EIS	Environmental Impact Statement
EJ	Environmental Justice
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
HME	Human Monocytic Ehrlichiosis
IWDM	Integrated Wildlife Damage Management
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	Notice of Availability
NR	Natural Resources
NTSB	National Transportation Safety Board
RPA	Reasonable and Prudent Alternatives
RPM	Reasonable and Prudent Measures
SOP	Standard Operating Procedure
TB	Tuberculosis
T/E	Threatened and Endangered
TSE	Transmissible Spongiform Encephalopathies
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of Interior
USFWS	U.S. Fish and Wildlife Service
WAC	Wisconsin Administrative Code
WAS	Wisconsin Agricultural Statistics
WDACP	Wildlife Damage Abatement and Claims Program
WDATCP	Wisconsin Department of Agriculture, Trade, and Consumer Protection
WDHFS	Wisconsin Department of Health and Family Services
WDNR	Wisconsin Department of Natural Resources
WS	Wildlife Services

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CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

In the United States, wildlife is a publicly-owned resource held in trust and managed by state and federal agencies. These agencies have a mandate to provide for the welfare and perpetuation of wildlife and be responsive to various groups while considering potential socioeconomic conflicts (Wolfe and Chapman 1987). Therefore, these agencies manage wildlife as a renewable natural resource. Management may be directed toward protection and preservation of threatened and endangered (T/E) species, maintenance of wildlife populations for harvest and non-harvest purposes, and management of nuisance wildlife (Wolfe and Chapman 1987). Such actions generally include managing individual animals, populations, their habitats, and/or a combination of these. This may be accomplished through regulatory mechanisms, technical assistance, or direct or indirect management actions by professionals to affected entities.

Within Wisconsin and across the United States, wildlife habitat has been substantially changed as human populations expand and land is used for human needs. These human uses and needs often compete with wildlife thereby increasing the potential for conflicting human/wildlife interactions. In addition, segments of the public desire protection for all wildlife; this protection can create localized conflicts between human and wildlife activities. The *Animal Damage Control Programmatic Final Environmental Impact Statement* (EIS) summarizes the relationship in American culture of wildlife values and wildlife damage in this way (United States Department of Agriculture (USDA) 1997):

"Wildlife has either positive or negative values, depending on varying human perspectives and circumstances . . . Wildlife is generally regarded as providing economic, recreational and aesthetic benefits . . . and the mere knowledge that wildlife exists is a positive benefit to many people. However . . . the activities of some wildlife may result in economic losses to agriculture and damage to property . . . Sensitivity to varying perspectives and value is required to manage the balance between human and wildlife needs. In addressing conflicts, wildlife managers must consider not only the needs of those directly affected by wildlife damage but a range of environmental, sociocultural and economic considerations as well."

Biological carrying capacity is defined as the land's or habitat's ability to support healthy populations of wildlife without degradation to the environment over an extended period of time (Decker and Purdy 1988). **Wildlife acceptance capacity, or cultural carrying capacity**, is the upper limit of human tolerance for wildlife or the maximum number of a given species that can coexist compatibly with local human populations (Decker and Purdy 1988). For any given damage situation, there will be varying cultural carrying capacity thresholds by those directly and indirectly affected by the animals causing damage. This threshold of damage is a primary factor in determining the wildlife acceptance capacity. Others with different values than the entity suffering damages may see the need for more tolerance for economic losses or different management approaches to decrease losses to a more tolerable level, again, creating the potential for conflict.

Wildlife damage management is the science of reducing damage or other problems caused by wildlife, is recognized as an integral part of wildlife management (The Wildlife Society 1992), but often misunderstood because many individuals perceive that wildlife damage management consists only of lethal actions. United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) uses an Integrated Wildlife Damage Management (IWDM) approach, known as Integrated Pest Management (WS Directive 2.105¹), in which a combination of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1 of USDA (1997²). These methods may include alteration of cultural practices and habitat and behavioral modification to prevent or reduce damage. The reduction of wildlife damage may also require that a local population of offending animal(s) be reduced through lethal means. However, killing the offending animal is only one approach considered by WS in developing management strategies. The alleviation of wildlife damage is the main focus of WS, whether addressed by WS professionals or other individuals, and consists of one or a combination of three basic strategies:

- 1) Manage the resource being damaged so it is more difficult for the wildlife species or individuals to cause damage. This includes changing cultural practices to make the resource less accessible or the damage perceived to be more acceptable.
- 2) Manage the wildlife species or individuals responsible for, or associated with, the damage so that they cannot cause damage, or
- 3) Physical separation of the two so that the damage is minimized. This includes placement of barriers, such as fences or structures, between the offending wildlife or populations and the resource being protected.

This environmental assessment (EA) documents the analysis of the potential environmental effects of a proposed Wisconsin WS integrated cervid (i.e., free-ranging or captive white-tailed deer (*Odocoileus virginianus*), and captive elk (*Cervus canadensis*), mule deer (*O. hemionus*) or other species in the Family Cervidae) damage management program to alleviate damage to agriculture (e.g., crops), property (e.g., landscaping), natural resources (e.g., browsing, habitat modification), and animal (e.g., disease transmission) and human health (e.g., disease transmission, vehicle collisions) and safety, and to assist the Wisconsin Department of Natural Resources (WDNR) in monitoring, managing and maintaining the health of Wisconsin's free-ranging white-tailed deer herd. This analysis relies mainly on existing data contained in published documents (Appendix A), including USDA (2002³), and USDA (1997), the Wisconsin Department of Natural Resources Deer Population Goals and Harvest Management Environmental Assessment, and the Wisconsin Department of Natural Resources Environmental Impact Statement – on Rules to Eradicate Chronic Wasting Disease from Wisconsin's Free-Ranging White-tailed Deer Herd (WDNR) 2003) which are incorporated by reference.

¹ WS Policy Manual provides guidance for WS personnel to conduct wildlife damage management through Program Directives. WS Directives referenced in this EA can be found in the manual but will not be referenced in the Literature Cited Appendix.

² USDA (1997) may be obtained by contacting the USDA, Animal and Plant Health Inspection Service (APHIS), WS Operational Support Staff at 4700 River Road, Unit 87, Riverdale, MD 20737-1234.

³ USDA (2002) may be obtained by contacting Environmental Services, Policy and Program Development, Animal and Plant Health Inspection Service, U.S. Department of Agriculture, 4700 River Road, Unit 149, Riverdale, MD 20737-1238.

Normally, according to the APHIS procedures implementing the National Environmental Policy Act (NEPA), individual wildlife damage management actions may be categorically excluded (7 CFR 372.5(c), 60 Fed. Reg. 6,000-6,003 (1995)). WS has decided, in this case, to prepare this EA to facilitate planning, interagency coordination, streamline program management, and to determine if there are any potentially significant or cumulative impacts from the proposed and planned cooperative damage management program⁴. In addition, this EA has been prepared to clearly communicate to the public the analysis of individual and cumulative impacts from the proposed action. All wildlife damage management that would take place in Wisconsin would be undertaken according to relevant laws, regulations, policies, orders and procedures, including the Endangered Species Act (ESA). Notice of the availability of this document will be made available consistent with the agency's NEPA procedures.

WS is a cooperatively funded, service-oriented program from which other governmental agencies⁵ and entities may request assistance. Before any wildlife damage management is conducted, Cooperative Agreements, Agreements for Control or other comparable documents are in place. As requested, WS cooperates with resource management agencies to reduce wildlife damage effectively and efficiently according to applicable federal, state and local laws and Memorandums of Understanding (MOUs) between WS and those agencies. WS' mission, developed through its strategic planning process, is: 1) *"to provide leadership in wildlife damage management in the protection of America's agricultural, industrial and natural resources, and 2) to safeguard public health and safety."* WS' Policy Manual reflects this mission and provides guidance for engaging in wildlife damage management through:

- Training of wildlife damage management professionals;
- Development and improvement of strategies to reduce losses and threats to humans from wildlife;
- Collection, evaluation, and dissemination of management information;
- Informing and educating the public on how to reduce wildlife damage;
- Providing data and a source for limited-use management materials and equipment, including pesticides (USDA 1999)

1.2 PURPOSE

The purpose of WS' cervid damage management⁶ in Wisconsin is to: 1) alleviate cervid damage to agriculture (e.g., crops), property (e.g., primarily landscaping), natural resources (e.g., over browsing), and animal and human health and safety (e.g., disease transmission and aircraft collisions), 2) assist state and other federal agencies in communications, information dissemination, education, research, surveillance and monitoring, and disease/herd management to maintain the health of Wisconsin's free-ranging deer herd, and 3) assist in assessing the health of captive cervids and depopulate infected herds. WS' involvement in cervid damage management will provide residents of Wisconsin and the WDNR measures to facilitate swift and

⁴ All WS deer damage management activities are conducted in cooperation with the WDNR and/or Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP) after consultation, as appropriate.

⁵ The State of Wisconsin has the primary responsibility for wildlife management and could conduct wildlife management related activities without WS assistance. This cervid damage management effort however would be facilitated by WS to provide assistance to ensure more timely removal of damaging, diseased or potentially exposed animals.

⁶ WS' mission is to reduce wildlife damage.

more effective program delivery. Under the Proposed Action, cervid damage management could be conducted under cooperative agreements, MOU or other comparable documents on private, federal, state, tribal, county, and municipal lands in Wisconsin upon request for WS assistance and in coordination with the WDNR. Between FY 1995 and 2001, WI WS technical and/or direct control assistance has been requested on over 36,800 occasions when deer were damaging agricultural crops and in excess of 1900 situations when deer were damaging property or natural resources and/or threatening human health/safety. WS' roles would be coordinated with the WDNR and WDATCP, and consistent with other uses of the area.

In this EA, WS recognizes that cervids have no *intent* to do harm. They inhabit (i.e., reproduce, walk, forage, deposit waste, etc.) habitats where they can find a *niche*. If they do "*wrongs*," people characterize this as damage. *Wrongs*, unfortunately, are determined not merely in spatial terms but also with respect to time and other circumstances that define the *wrongness*. (For example: deer living in the wilds of Wisconsin may not be a problem while deer living on an airport facility could cause human safety concerns, potential human injuries, and destruction of property.)

1.2.1 BACKGROUND and NEED FOR ACTION

Wisconsin must manage its free-ranging deer herd to satisfy numerous interest groups. Most landowners enjoy having some deer on their property, despite real or potential damage. This fact, coupled with the economic and aesthetic values of deer, suggests that a combination of herd and damage management strategies will be necessary to meet most people's interests. Wildlife damage causes conflicts between individuals and polarizes interest groups. This complicates the work of resource management agencies, who must work with all interests to implement resource goals. The absence of an adequate cervid damage management assistance program has resulted in a high level of frustration for some agricultural groups or growers.

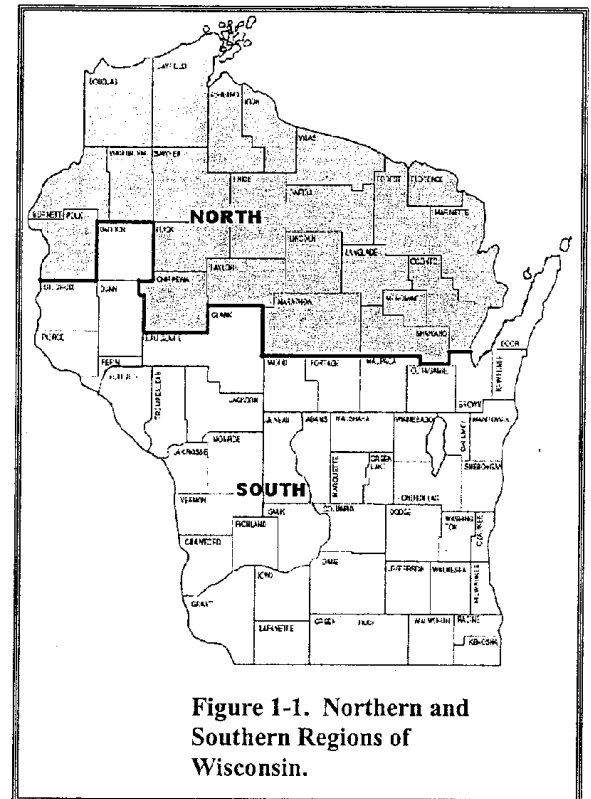


Figure 1-1. Northern and Southern Regions of Wisconsin.

1.2.1.1 Wisconsin White-tailed Deer Population History and Status

Northern Wisconsin – Records of free-ranging white-tailed deer abundance during pre-settlement times are fragmentary (Swift 1946, Schorger 1953, Christensen 1959). Dahlberg and Guettinger (1956) attempted to schematically depict the relative abundance of deer from 1750 to 1955. Based on their estimates of pre-settlement densities, it is possible to calculate an average population of about 200,000 deer on the present area of northern forest (Figure 1-1) in pre-settlement times.

Using pre-settlement forest composition data from Habeck and Curtis (1959) and Finley (1976), it is possible that the average density of free-ranging deer may have approached 14-15 deer/mi², or about 220,000 deer. These deer estimates assume deer densities of 30/deer mi² in aspen (*Populus tremuloides/grandidenata*), oak (*Quercus spp.*), and barrens; 20/mi² in pine; and 10/mi² in the remaining forest types. Deer density estimates expected in these habitats is based on present day knowledge of deer-habitat relationships. How the predator complex and Native Americans may have influenced pre-settlement deer populations is unknown.

Frelich and Lorimer (1991) reported that pre-settlement forests in Wisconsin and upper Michigan had frequent small-scale disturbances. Up to 15% of the forest area was in small gaps in a single decade regenerating from wind throw and to a lesser extent fires. These frequent small gap disturbances would likely have increased the biological carrying capacity for deer.

The highest deer populations in recent centuries probably occurred in 1942 or 1943 (Bersing 1966) following extensive logging and fires in northern Wisconsin. The reported harvest of 51,000 fork-antlered bucks in 1943 suggests a northern deer population in excess of 700,000 deer and deer drive counts averaged 45 deer/mi² from 1935 to 1941 (Swift 1946). If only the larger samples from 1939 and 1940 results are used, drive counts would suggest a population of about 600,000 deer in those years. In 1938, it was estimated that 89% of the Nicolet National Forest was clear cut and/or burned with only 11% left in commercial size trees; a condition that was probably representative of most of the area of the northern forest (Nicolet National Forest 1988). This habitat would have been prime summer deer range.

Present day habitat is different from habitats both during the pre-settlement and the post-logging era. Forests have re-grown from the logging days, areas of aspen have succeeded to more shade-tolerant types, and openings have declined. Current WDNR free-ranging deer population goals seek to maintain an over-winter population of about 280,000 in the northern forest which is about 65-70% of the average biological carrying capacity of the region (maximum carrying capacity has been estimated at 400,000 deer for the period 1964-86). Since 1962, deer populations have ranged from a low of fewer than 200,000 deer in 1972 following a sequence of severe winters to more than 677,000 deer in 2000 (WDNR 2003).

Southern Wisconsin – The same paucity of data exists for deer populations in southern Wisconsin during pre-settlement times. It is generally believed that deer were abundant in southern Wisconsin during pre-settlement (20-50 deer/mi²) but then declined to very low numbers during the period after settlement as a result of subsistence hunting and conversion of land to agriculture (Dahlberg and Guettinger 1956). Free-ranging deer numbers remained low in southern Wisconsin until the late 1960-70's when populations began to increase. In 2000, deer populations in southern Wisconsin reached more than 1,141,000 animals (R. Rolley, WDNR, pers. comm. 2003).

In an attempt to reduce deer densities in much of the state, the WDNR implemented an aggressive deer harvest management plan in 2000. This resulted in a state/provincial North American record annual harvest exceeding 617,000 deer.

1.2.1.2 Economics of White-tailed Deer in Wisconsin

Free-ranging white-tailed deer are important to Wisconsin's economy and the dollars generated from deer license sales support conservation efforts for many wildlife species. In 2002, archery and gun hunters purchased 618,945 licenses and harvested an estimated 371,575 deer (B. Koele, WDNR, pers. comm., 2002). Deer archery and gun license sales alone totaled about \$25 million in 2000. In 1996, the average big game hunter spent an estimated \$460 on transportation, food, lodging, equipment and licenses (USDI 1996) with this spending bolstering Wisconsin's economy by more than \$1.5 billion annually (Bazzell 2002). The 1996 estimated value of venison from harvested deer is about \$37 million (Vander Zouwen 1998). In addition, landowners and vacationers enjoy viewing deer, although it is difficult to assign a dollar value to these aesthetic values. However, deer can also have a negative economic impact by damaging agricultural crops, landscaping and natural resources, and can threaten animal and human health and safety.

1.2.1.3 White-tailed Deer Damage to Agriculture

Wisconsin is an agricultural state with nearly half of its 35.8 million acres in agricultural production (Wisconsin Agricultural Statistics (WAS) 2001). The State's agricultural growers produce about \$5.22 billion in commodities each year, making it the eighth most productive agricultural state in the nation. Wisconsin is also rich in wildlife resources. These resources provide abundant recreational opportunities, but also require Wisconsin agricultural producers to contend with significant wildlife damage to crops.

Deer damage to crops is a major concern among the agricultural community and high populations of deer are responsible for 90% of the wildlife crop damage reported in Wisconsin (WDNR 2003). Many factors determine the amount of agricultural damage caused by deer in Wisconsin. Deer population size, farm location, and growing conditions are just a few of these factors. In Wisconsin, the WDATCP and University of Wisconsin-Madison conducted a survey of agricultural growers in 1984 and found that the increasing deer herd was causing perceived loss of about \$36.7 million (WDATCP 1984). In 1997, it was estimated that deer caused up to \$28 million worth of crop losses to about 14 major agricultural crops to Wisconsin agricultural producers (Wisconsin Conservation Congress 2000). Wisconsin's deer populations are even higher now than in 1997 (WDNR 2003). In deer management units (DMU) where over winter goals are 30 to 35 deer/mi² of deer range, Wisconsin has seen high demands for deer-damage shooting permits and damage losses from deer approaching \$150,000/year/DMU (WDNR 2003). Areas with the highest appraised damage to agricultural crops are in the southwestern, east central and west central portions of the state where over winter deer populations have exceeded 25-30 deer/mi² of deer habitat (Stowell 1995).

In the interest of promoting landowners' tolerance for wildlife, Wisconsin has operated various wildlife damage programs through time, and since 1931 provided assistance to agricultural growers whose crops are damaged by wildlife. Wisconsin statute (Stat. 29.889) and Wisconsin Administrative Code NR 12 and 19 authorize the WDNR to operate the Wildlife Damage Abatement and Claims Program (WDACP) (WDNR 1998); damage abatement, or the reduction

of crop damage or loss is the emphasis of the WDACP. This program provides assistance to commercial agricultural growers for damage caused by free-ranging white-tailed deer, wild turkeys (*Meleagris gallopavo*), Canada geese (*Branta canadensis*) and black bear (*Ursus americanus*). The WDACP only provides damage and/or compensation assistance for damage to agricultural crops; not for damage to landscaping, family/residential gardens or vehicle/property damage and is funded by hunter dollars; WS provides additional funds for WDACP administration in 45 Wisconsin counties. The WDNR provides oversight for the WDACP and individual counties administer the program. The WDACP is currently implemented in 69 of 72 Wisconsin counties. County WDACP administrators are reimbursed by the WDNR for all program expenditures. Abatement tools most commonly used in the WDACP include repellents, scare devices, fences and localized population reduction.

The WDNR paid 570 wildlife damage claims for damage that occurred during 2001, reflecting \$1,853,732 in appraised losses. Since 1994, the WDACP has annually:

- Assessed between \$1.5 million and \$3.2 million in deer damage to agricultural crops.
- Recommended the issuance of between 424 and 799 agricultural deer damage shooting permits that resulted in the harvest of up to 7,471 deer per year.
- Reimbursed between 470 and 1,070 eligible agricultural growers for damage to crops.

In 2000, the WDACP initiated a deer donation program to pay for the processing of hunter harvested deer that were donated to charitable organizations for human consumption. In 2000 through 2002, the Wisconsin Deer Donation Program processed 17,332 deer (776,000 pounds of venison) that were donated to food pantries throughout the state.

In addition, between fiscal years 1995 and 2001, WS received 36,898 requests for assistance in identifying, quantifying, and resolving free-ranging deer conflicts with agricultural resources in Wisconsin (Wisconsin WS unpubl. data). WS efforts to implement the WDACP in WS cooperating counties between 1995 through 2000 resulted in the distribution of the following deer damage abatement materials to agricultural growers:

- 433 gallons of chemical repellents
- 875,000 linear feet of temporary electric fence
- 17,549 linear feet of temporary barrier fence
- 246,706 linear feet of permanent deer barrier fence
- 32,116 rounds of pyrotechnics
- 476 propane exploders

1.2.1.4 Deer-Vehicle Collisions

Deer-vehicle collisions are a serious concern nationwide because of property damage and the potential for human injury and death (Conover 1997, Conover et al. 1995, Romin and Bissonette 1996). Conover et al. (1995) estimated that 1.5 million deer-vehicle collisions occur annually in the U.S. and that the average cost to repair the vehicle after a collision was \$1,500. The total damage to vehicles in the U.S. each year from deer-vehicle collisions is estimated to be more than \$1 billion (Conover et al. 1995). Additionally, Conover et al. (1995) estimated that deer-vehicle collisions in the United States result in 29,000 injuries and 211 human fatalities annually. Nationwide Insurance (1993) estimated that 120 people are killed annually in animal-vehicle

accidents in the U.S. In some regions of Wisconsin, where habitats can support more than 80 deer/mi², over winter population goals are, in part, determined by human tolerance. Vehicle-deer collisions are a primary factor in determining how many deer people will accept (WDNR 2003).

In Wisconsin, the statewide deer-vehicle collisions have ranged from 3,046 in 1960 to 47,555 in 1999 and have steadily increased during recent years (Figure 1-2). A definite trend has emerged, indicating a relationship between both number of deer stuck by vehicles, the overall deer population, and the number of miles driven. In addition, the risk of vehicle-deer collisions has not been reduced by whistles, roadside reflectors, or fencing (WDNR 2003). The

only known effective way to reduce vehicle-deer hazards, without reducing traffic, is to reduce deer numbers (WDNR 2003). Areas with high human populations and high miles driven have the highest incidence of vehicle-deer collisions. Any increase in deer numbers is expected to result in higher numbers of vehicle-deer collisions, particularly if traffic volumes do not decrease. Similarly, decreases in deer numbers would be expected to result in lower levels of vehicle-deer collisions (WDNR 2003).

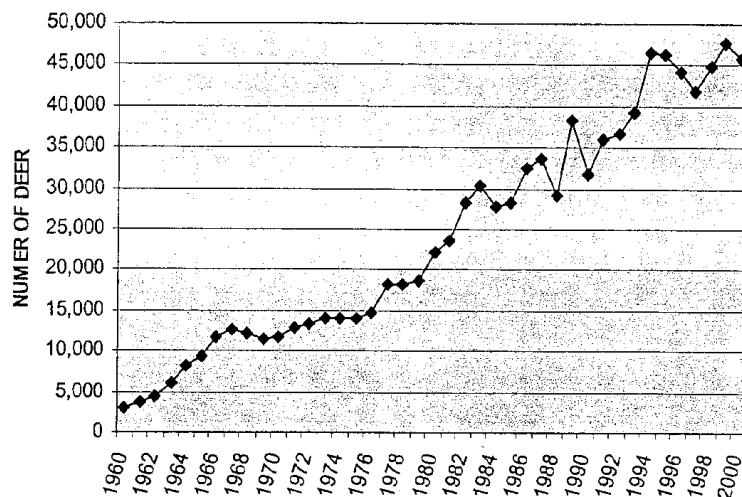
The Wisconsin deer collision estimates represent only those deer which were salvaged through the WDNR permit system and/or deer that were removed from the roadway by a contractor (B. Koele, WDNR, pers. comm. 2002. In 1990, the WDNR also estimated combined property damage and personal injury from deer-vehicle accidents in Wisconsin at \$92 million annually (WDNR 1994).

1.2.1.5 Threats to Human Health and Safety from Disease Transmission

Goals for managing diseases include: 1) preventing the introduction of disease where it does not exist, 2) control the spread of existing disease from an infected area, and/or 3) eradication of existing diseases (WDNR 2003). To achieve these goals there are four strategies for wildlife disease management: 1) directly attacking the disease, 2) blocking the transmission of the disease, 3) managing environmental conditions to reduce transmission and/or 4) reducing the population of susceptible individuals below the threshold required for the disease to persist. Some of the deer related diseases of concern are:

Lyme Disease. Currently, the most common disease involving deer is Lyme disease, caused by the spirochete *Borrelia burgdorferi* and transmitted to humans by the bite of an infected deer tick (*Ixodes dammini*) (Conover 1997). Initial symptoms of Lyme disease include a flu-like illness

Figure 1-2. WISCONSIN DEER-VEHICLE COLLISIONS: 1960-1999.



with headache, fever, muscle or joint pain, neck stiffness, swollen glands, jaw discomfort, and inflammation of the eye membranes (McLean 1994). If left untreated, during its early stages, Lyme disease may lead to serious and persistent health problems including arthritis, carditis, and various neurological disorders (McLean 1994).

Research has shown a direct correlation between infected ticks, deer numbers, and Lyme disease cases (Deblinger et al. 1993, Magnarelli et al. 1984). Deer are an important reservoir for Lyme disease and are the primary host for the adult deer tick (Conover 1997). Lyme disease incidence has also been linked to landscape features such as urban developed areas versus wooded residential areas (Montgomery County Health Department 2000). More than 7,000 cases of Lyme disease have been reported in Wisconsin since surveillance for the disease began in 1980 (<http://www.dhfs.state.wi.us/healthtips/BCD/LymeDisease.htm>). The Wisconsin Department of Health and Family Services (WDHFS) recorded an average annual incidence of Lyme disease among county residents to vary from <1 to ≥ 100 cases/100,000 population during a 5 year period (1995-1999). However, the county of exposure is only determined for patients with erythematous migraines and no travel outside the county of residence for 30 days prior to onset. The county of acquisition could not be determined for 1,804 of 2,391 cases.

Human Ehrlichiosis. In 1986, another serious tick-borne zoonosis, human ehrlichiosis, was discovered in the U.S. (McQuiston et al. 1999). Two distinct forms of the illness may affect humans: human monocytic ehrlichiosis (HME) and human granulocytic ehrlichiosis (McQuiston et al. 1999, Lockhart et al. 1997). The bacterial agents that cause ehrlichiosis are transmitted to humans by infected ticks that acquire the agents from feeding on infected animal reservoirs (McQuiston et al. 1999). Ehrlichiosis in humans may result in fever, headache, myalgia, nausea, and occasionally death (McQuiston et al. 1999, Little et al. 1998). HME is the type of ehrlichiosis predominantly found in the southeastern, south-central, and mid-Atlantic U.S. White-tailed deer are major hosts for *Amblyomma americanum*, the tick that transmits HME, and deer have been identified as a reservoir for HME (Little et al. 1998, Lockhart et al. 1997).

Bovine Tuberculosis. Tuberculosis (TB) is a contagious disease of both animals and humans and can be caused by three specific types of the *Mycobacterium* bacteria. Bovine TB, caused by *Mycobacterium bovis*, primarily affects cattle and other bovine-like animals (e.g., bison, deer, and goats) but can be transmitted to humans and other animals. The WDHFS reports that 475 people in Wisconsin have been diagnosed with tuberculosis between 1998 and 2002 (http://www.dhfs.state.wi.us/dph_bcd/TB/pdf/tb_cases_98-02.pdf). In addition, 6 captive elk herds in Wisconsin since 1997 were confirmed to have tuberculosis (D. O'Connor, WDATCP, pers. comm., 2003).

Pathogenesis of *M. bovis* infection in deer begins with either inhalation or ingestion of infectious organisms. Transmission is aided by high deer densities and prolonged contact, as occurs at supplemental feeding sites. The bacilli commonly invade the tonsils first, later spreading to other cranial lymph nodes. If the infection is contained, it spreads no further. In some animals, however, the infection spreads to the thorax where it may disseminate throughout the lungs. These animals may then shed the bacteria by aerosol or oral secretions. The most susceptible animals develop infections throughout their abdominal organs, and can even shed bacilli through their feces or through milk to their fawns.

Bovine TB has affected both animal and human health for years. During the early 20th century, the disease affected more U.S. farm animals than did all other infectious diseases combined. USDA's Cooperative State-Federal Tuberculosis Eradication Program, which began in 1917, is chiefly responsible for the near-eradication of the disease from the nation's livestock population.

Foot and Mouth Disease. There are no known recent cases of Foot and Mouth Disease in white-tailed deer in the U.S. However, deer are a known vector of this virulent disease.

Chronic Wasting Disease (CWD). CWD has been known to occur in deer and elk in the U.S. for decades and is currently established in Wisconsin (see Section 1.2.1.8). In spite of ongoing surveillance for similar disease syndromes in humans, there has not been a documented instance of people contracting the disease from butchering or eating venison from CWD-infected animals. A World Health Organization panel of experts reviewed all the available information on CWD and concluded that there is no scientific evidence that CWD can infect humans (WDNR 2003). CWD is similar to the human Transmissible Spongiform Encephalopathies (TSE) disease, Creutzfeldt - Jakob disease, but the diseases have not been linked the way "classic" and "new variant" Creutzfeldt - Jakob disease in people has been linked to consumption of products from cattle with bovine spongiform encephalopathy. However, there is much that scientists still do not know about CWD, and one cannot state that transmission of CWD to humans is absolutely impossible.

1.2.1.6 Deer Damage at Airports

Airports provide ideal habitat for deer and other wildlife due to large grassy areas often adjacent to brushy, forested areas used as noise barriers. Airport habitats provide excellent feeding and bedding sites for deer and they are usually protected from hunting and many other human disturbances. The presence of white-tailed deer is a commonly encountered problem at airfields in Wisconsin, threatening the safe operation of aircraft at those facilities. Wisconsin has a total of 136 public use airports, 11 of which are subject to Federal Aviation Administration (FAA) Federal Aviation Regulations Part 139 (J. Espy, FAA, pers. comm. 1998). Since 1991, 36 airports in Wisconsin have contacted WS for assistance in reducing deer threats to aviation safety.

Deer-aircraft collisions can potentially cause loss of human life, injury to passengers or people on the ground, and cause major damage or malfunction of aircraft and airport facilities. Serious consequences are also possible if pilots lose control of the aircraft while attempting to avert a collision with deer. From 1990 through 2000 there were 28 reported deer-aircraft strikes in Wisconsin (FAA-USDA Wildlife Services-Aircraft Strike Database, Sandusky, Ohio). Mammals colliding with aircraft during the most vulnerable phases of flight, takeoff or landing, can cause the aircraft to crash or sustain physical damage (USDA 1998). Mammals are characteristically unpredictable in their initial response to approaching aircraft. Deer may cause a strike by wandering onto runway surfaces, be startled into the path of oncoming aircraft, or at night, "freeze" when caught in beams of landing lights. The majority of mammal strikes occur at night and in the fall of the year (Cleary et al. 2002), which is during the deer mating season.

Analysis of voluntary wildlife strike reports from three major airports in the U.S. showed that less than 20% of all strikes occurring at these airports were reported to FAA. Additionally, many reports received by the FAA were filed before aircraft damage had been fully assessed. For these reasons, information on the number of strikes and their associated costs is believed to underestimate the magnitude of the problem (Cleary et al. 2002).

1.2.1.7 Deer Damage to Urban Areas, Landscaping, and Natural Resources

Browsing by free-ranging deer damages and destroys landscaping and ornamental trees, shrubs and flowers. As rural areas are developed, deer habitat may actually be enhanced because fertilized lawns, gardens, and landscape plants can serve as high quality food sources for deer (Swihart et al. 1995). Furthermore, deer are prolific and adaptable, characteristics which allow them to exploit and prosper in most suitable habitat near urban areas, including residential areas (Jones and Witham 1995). During the last twenty years, free-ranging deer in Wisconsin have been using urban areas, nature preserves, and parks, and causing damage to shrubs and trees in these areas more frequently. Although damage to landscaping and ornamental plants has not been quantified in and around parks, deer have caused severe and costly property damage to homeowner's properties, and common areas. In addition to browsing, male deer damage trees and shrubs by antler rubbing which results in broken limbs and bark removal. While large trees may survive antler rubbing, smaller saplings often die or become scarred to the point that they are not acceptable for landscaping.

Deer overabundance can also negatively affect native vegetation and natural ecosystems in addition to ornamental landscape plantings. White-tailed deer selectively forage on vegetation (Strole and Anderson 1992), and thus can have adverse affects on certain herbaceous and woody species and on overall plant community structure (WDNR 1995, Waller and Alverson 1997, Alverson et. al. 1988). These changes can lead to adverse impacts on other wildlife species which depend on these plants for food and/or shelter.

Numerous studies have demonstrated that over browsing by deer can decrease tree reproduction, under story vegetative cover, plant density, and plant diversity (Warren 1991). For example, the Great Smokey Mountains National Park in Tennessee, an area heavily populated by deer, had a reduction in the number of plant species, a loss of hardwood species and a predominance of conifer species compared to an ecologically similar control area with fewer deer (Bratton 1979). This alteration and degradation of habitat from deer over-browsing can have a detrimental effect on deer herd health and may displace other wildlife communities (e.g., neotropical migrant songbirds and small mammals) that depend upon the under story vegetative habitat destroyed by deer browsing (Virginia Department of Game and Inland Fisheries 1999). Similarly, De Calesta (1997) reported that deer browsing affected vegetation that songbirds need for foraging, escape cover, and nesting. Species richness and abundance of intermediate canopy nesting songbirds was reduced in areas with high deer densities (De Calesta 1997). Intermediate canopy-nesting birds declined 37% in abundance and 27% in species diversity at high deer densities. Five species of birds disappeared when deer densities reached 38.1 deer/mi² and another two disappeared when deer reached 63.7 deer/mi². Casey and Hein (1983) found that 3 species of birds disappeared in a research preserve stocked with high densities of deer and that the densities of several other species of birds were lower than in an adjacent area with lower deer density.

Waller and Alverson (1997) hypothesize that by competing with squirrels and other fruit-eating animals for oak mast, deer may further affect many other species of animals and insects.

At current deer densities, some tree regeneration and browse sensitive plants have been suppressed resulting in secondary negative impacts on ground and shrub-nesting birds and possibly to small mammals (WDNR 2003). Negative effects on native ecosystems associated with too few white-tailed deer have not been described or demonstrated in the scientific literature (WDNR 2003).

In cooperation with the WDNR, WS has also established a 1-800 toll free hotline to answer questions and provide information to entities experiencing nuisance conflicts with deer and other wildlife. This telephone number is published in telephone directories throughout the state and has resulted in WS receiving 1,907 requests for assistance in dealing with non-agricultural related deer damage in the state from 1995 through 2001 (Wisconsin WS unpubl. data).

1.2.1.8 Chronic Wasting Disease in Wisconsin

CWD is a nervous system disease of deer and elk and belongs to the family of diseases known as TSE's, or prion diseases of cervids (elk, deer, and other members of the family Cervidae⁷). Though it shares certain symptoms with other TSE's like bovine spongiform encephalopathy ("Mad Cow Disease") or scrapie in sheep, it is a distinct disease affecting deer (*Odocoileus* spp.) (Williams and Young 1980) and elk (Williams and Young 1982) and is the only TSE, or prion disease, known to affect free-ranging species (Spraker et al. 1997, Miller et al. 2000). The best known approach for controlling CWD at this time is to drastically reduce the population of cervids in and around an infected area so diseased cervids are less likely to encounter and transmit the disease to healthy cervids (WDNR 2003)⁸. Models suggest that early, aggressive interaction via selective removal or more generalized reduction show the greatest promise in preventing new endemic foci from being established (Gross and Miller 2001). As a result, the WDNR has requested WS assistance in collecting tissue samples from deer harvested by hunters throughout the state⁹.

The mode of transmission between deer is not completely understood, however, it is thought that the disease is naturally transmitted through lateral mechanisms (i.e., orally from animal to animal) (Miller et al. 1998, Miller et al. 2000). Contact between infected and non-infected animals via saliva, urine and feces are the most likely route of transmission (WDNR 2003). Both sexes and all age classes show relatively uniform susceptibility with time of exposure to onset of clinical signs of the disease at about 15 months and the average time to death was about 23 months in captive mule deer (WDNR 2003). The potential also exists for CWD to be transmitted from free-ranging deer to captive deer and/or elk, and conversely the potential exists for CWD to be transmitted from captive deer and/or elk to free-ranging deer (L. Creekmore, APHIS-VS, pers. comm. 20002). However, there is no evidence that CWD can be transmitted under natural conditions to cattle. In addition, the prion that causes CWD is not easily killed by environmental

⁷ Domestic livestock are not known to be naturally susceptible to CWD (WDNR 2003).

⁸ Depopulation has been used to control a variety of diseases including rabies, plague, avian cholera, tuberculosis, histoplasmosis, rinderpest, brucellosis, and foot-and-mouth disease (WDNR 2003).

⁹ These activities were analyzed in the "Wisconsin Chronic Wasting Disease Program" EA (USDA 2002).

factors, heat or disinfections, so transmission from a contaminated environment may also be possible (Miller et al. 1998).

History and Symptoms

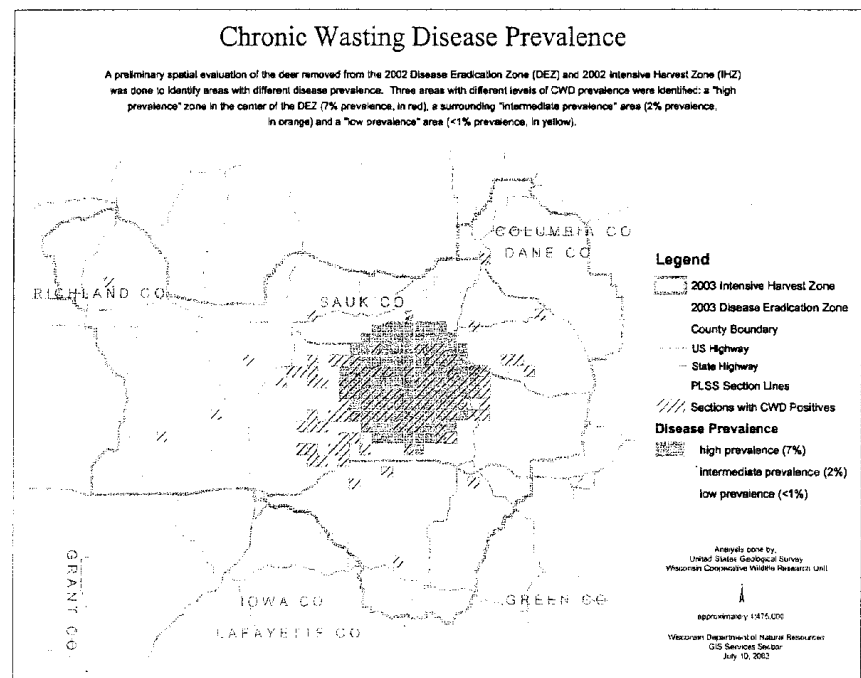
The first recognition of this disease was a clinical “wasting” syndrome in mule deer in 1967. CWD attacks the brains of infected cervids, causing the animal to become emaciated, display abnormal behavior, lose bodily functions and die. Signs of CWD identified in captive deer and elk include excessive salivation, loss of appetite, progressive weight loss, excessive thirst and urination, listlessness, teeth grinding, holding the head in a lowered position, blank facial expression, repetitive walking in set patterns in the pen and drooping ears (Williams et. al 2002).

CWD occurs in deer and elk primarily in northeastern Colorado, and adjacent parts of Wyoming, Nebraska, and South Dakota. However, CWD has recently been diagnosed in southern Wisconsin in Dane and Iowa Counties (Figure 1-3). The prevalence of CWD in white-tailed deer was estimated at approximately 3% in the newly discovered infected area, but local prevalence at the center of the outbreak was approximately 13% (WDNR 2003).

CWD has also been found to infect herds of captive elk in Colorado, Kansas, Montana, Nebraska, Oklahoma, South Dakota, and Saskatchewan. In April 2002, the WDATCP passed an emergency rule to manage CWD in Wisconsin's captive cervid industry through mandatory testing and controls on captive deer and elk movements (<http://datcp.state.wi.us/>) (WDNR Rule Order WM-05-03). In 2003, the WDNR estimated that there are 982 captive cervid farms in Wisconsin containing in excess of 35,000 head of animals (S. Molina, WDNR, pers. comm. 2002). By January 2003, in excess of

2000 captive deer and elk from herds in Wisconsin have been tested for CWD. Of the captive cervids tested, one white-tailed deer from Portage County and five white-tailed deer from Walworth County were confirmed to have had CWD. In addition, an ear-tagged deer killed outside the fence of this Walworth County deer farm tested positive for CWD. Deer on this farm were depopulated in December, 2002. Deer on the Portage County farm have been quarantined

Figure 1-3. Location of Deer Infected with CWD in Wisconsin.



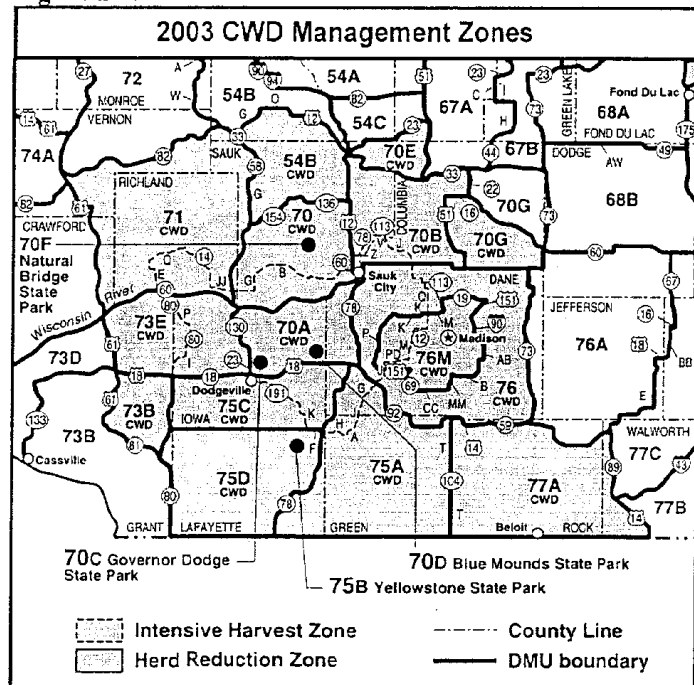
by WDATCP, as well deer and/or elk on additional farms in Dane, Marathon, Portage, and Walworth Counties where the infected deer may have also been held.

Wisconsin has been testing free-ranging white-tailed deer for CWD since 1999. Three deer harvested during the 2001 gun deer season tested positive for CWD out of 450 deer sampled. All three deer were harvested from Dane County, DMU 70A and all three were bucks from 2½-3 years of age. Six hundred and fifty deer from across the state were tested in 1999-2000 and all were found to be negative for CWD. In March 2002 the WDNR developed an emergency CWD surveillance plan for a 415 mi² area in Dane, Iowa and Sauk counties to determine the distribution of the disease. The plan was implemented by issuing permits to landowners/hunters to collect 500 deer in the surveillance area. The WDNR also requested WS assistance in the effort. WS personnel assisted the WDNR in the program after completing a categorical exclusion and receiving funding from the APHIS/WS program (USDA 2002). After allowing landowners to collect needed samples, WDNR and WS began efforts to collect deer in locations where landowners were unsuccessful. WS and WDNR teams collected deer on private and public land after receiving permission from landowners and after a safety plan was developed for each site. The surveillance project was completed in April 2002 after collecting 516 deer, of which WS collected 21 deer. This monitoring project documented that additional free-ranging deer in Dane and Iowa Counties were infected with CWD. As a result of this information, and subsequent information, the WDNR established a 411 mi² CWD eradication/intensive deer harvest zone in an area of Dane, Sauk, and Iowa Counties where CWD had been identified. The zone was subsequently expanded to 874 mi² (Figure 1-4), but sites could be added or modified as program surveillance is better able to identify other locations where CWD is present.

In addition, the WDNR has established an extremely liberal deer hunting season from October 24, 2002 through January 31, 2003 in DMU 70A. WDNR deer population reduction efforts

during the four, special summer, one week deer hunting periods included WDNR and WS shooters. Future deer population reduction efforts may be requested by the WDNR and could include the use of WS' collecting deer through shooting, land restraint snares, and/or from aircraft (WS Directive 2.620). The WDNR developed 15 new CWD Deer Management Units surrounding the eradication/intensive harvest zone in which an over winter deer population goal of 10 deer/mi² was established. Of approximately 18,323 deer from the intensive harvest and management zones sampled for CWD by January 2003, 207 deer have been diagnosed positive for CWD. Six of the positive deer were collected in the CWD Management Zone and the

Figure 1-4.



remainder of the positive deer was collected from the CWD Intensive Harvest Zone in Dane and Iowa Counties. This infection rate yields a prevalence of <1.7% in the CWD Intensive Harvest Zone and <0.1% CWD Management Zone ([http://prodmtex00.dnr.state.wi.us/pls/inter1/pk_cwd_zonerpt\\$.startup](http://prodmtex00.dnr.state.wi.us/pls/inter1/pk_cwd_zonerpt$.startup)). An additional 22,917 deer samples were collected throughout the rest of the state. By June 2003, all of the 22,917 samples were analyzed and determined not to be positive for CWD.

1.3 PROPOSED ACTION

WS proposes to administer an IWDM program to alleviate cervid (i.e., free-ranging white-tailed deer, and captive elk, deer and other cervid) damage to agriculture (e.g., crops), property (e.g., landscaping), natural resources (e.g., over browsing), and animal and human health and safety (e.g. disease transmission, aircraft collisions) and to assist the WDNR¹⁰ in maintaining the health of Wisconsin's free-ranging white-tailed deer herd¹¹. An IWDM program would be implemented on private and public lands of Wisconsin¹² where a need exists, a request is received, and funding is available. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods for preventing or reducing damage while minimizing harmful effects of damage management measures on humans, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model¹³ (Slate et al. 1992) to help determine the most appropriate action(s) to take. When appropriate, habitat modifications, harassment, repellents, and physical exclusion could be recommended and utilized to reduce cervid damage. In other situations, cervids could be removed as humanely as possible by shooting and live capture followed by relocation or euthanasia under permits issued by the WDNR. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage or potential damage situation. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. Cervid damage management would be conducted in the State, when requested and after consultation with the WDNR or Wisconsin Department of Agriculture, Trade and Consumer Protection (WDATCP), as appropriate, on private or public property after an *Agreement for Control* or other comparable document has been completed. During FY 99, 00, 01, and 02 WS provided technical assistance services to residents across the entire state of Wisconsin. During this time period WS also conducted operational cervid damage management

¹⁰ Actions to reduce cervid damage are within the control of Wisconsin State agencies; however APHIS may provide limited assistance to the State in their management efforts. Therefore, Wisconsin State agencies could take action independent of WS or other Federal agencies. Primary control for wildlife management resides with the State of Wisconsin, thus calling into question the value of any Federal process in planning and decision making for a cervid damage management program.

¹¹ The WDNR requested WS assistance to remove deer/elk for CWD diagnostic purposes. Based on epidemiology, CWD transmission is thought to be lateral, or from animal to animal. The factors determining transmission and with the infrequent detection of CWD, suggest that prompt action may assist in preventing the potential spread of CWD (Chronic Wasting Disease in Cervids; Payment of Indemnity; APHIS; Interim Rule: Federal Register, February 8, 2002; page 5926).

¹² This EA addresses cervid damage management on a statewide basis on lands under cooperative agreement or other comparable document because wildlife, especially deer in this case, are managed by the WDNR under statewide statutes laws and regulations of Wisconsin. WS would consult with the WDNR and other state and federal agencies on a regular basis to insure no adverse impacts to wildlife populations or other resources of the state occur.

¹³ The WS Decision Model is not a written process but rather a mental problem solving process to determine appropriate management actions to take.

activities on only 8 farms encompassing 2058 acres, or less than about 0.006% of the state and on some additional acreage at the request of the WDNR for CWD surveillance and monitoring purposes. All cervid damage management would be consistent with other uses of the area and would comply with appropriate federal, state and local laws. In addition, consultations with the WDNR and U. S. Fish and Wildlife Service (USFWS) may be appropriate to ensure WS actions do not adversely affect state and federally listed T/E species.

1.4 FRAMEWORK FOR CERVID DAMAGE MANAGEMENT IN WISCONSIN

The potential for free-ranging deer populations in Wisconsin to exceed carrying capacity, to impinge on the well being of other plant and animal species and to conflict with land-use practices as well as human safety and health necessitates effective herd management. Financial, social, ethical and logistical constraints require that deer management be practical and fiscally responsible.

1.4.1 Wildlife Services Cervid Damage Management Objectives

- Respond to 100% of the requests for assistance with the appropriate action (technical assistance or operational management assistance) as determined by Wisconsin WS personnel applying the WS Decision Model (Slate et al. 1992) in coordination with the WDNR.
- Take no non-target animals during WS cervid damage management assistance.
- Assist the WDNR and/or WDATCP manage their statutory cervid responsibility

1.4.2 Relationship of This EA to Other Environmental Documents

- WS has issued a final EIS (USDA 1997) and Record of Decision on the National APHIS-WS program. Pertinent portion of this EIS are incorporated by reference.
- APHIS, Environmental Services issued a "Wisconsin Chronic Wasting Disease Program" EA in August 2002. Pertinent portion of this EIS are incorporated by reference.
- Wisconsin Department of Natural Resources Deer Population Goals and Harvest Management Environmental Assessment. Pertinent portion of this EIS are incorporated by reference.
- Wisconsin Department of Natural Resources EIS – on Rules to Eradicate Chronic Wasting Disease from Wisconsin's Free-Ranging White-tailed Deer Herd; February 2003 (www.dnr.state.wi.us/org/land/wildlife/whealth/issues/CWD/eis/htm). Pertinent portion of this EIS are incorporated by reference.

1.4.3 Decision to be Made

Based on agency relationships, MOUs and legislative mandates, WS is the lead agency for this EA, and therefore responsible for the scope, content and decisions made. The WDNR and WDATCP had input during preparation of the EA to ensure an interdisciplinary approach in compliance with NEPA and agency mandates, policies and regulations.

Based on the scope of this EA, the decisions to be made are:

- Should WS conduct a coordinated cervid damage management program in Wisconsin to alleviate damage to agriculture, property, natural resources, and human health and safety, and to assist other agencies in monitoring, managing and maintaining the health of Wisconsin's cervids?
- What mitigation measures should be implemented by WS?
- Would the proposed action have significant impacts on the quality of the human environment requiring preparation of an EIS?

1.5 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT ANALYSIS

Actions Analyzed. This EA evaluates cervid damage management to protect agriculture, property, natural resources, and human and animal health and safety as coordinated with the WDNR and/or WDATCP, and to assist other agencies, as appropriate, in monitoring, managing and maintaining the health of Wisconsin's cervid herds.

American Indian Lands and Tribes. Currently WS does not have any MOUs or signed agreements with any American Indian tribe in Wisconsin. Any WS activities conducted on tribal lands would only be conducted at the request of the tribe and after appropriate authorizing documents were signed. Therefore, WS would only conduct cervid damage management activities on tribal lands after agreements with the tribes to conduct such activities are in place. If WS enters into an agreement with a tribe for cervid damage management, this EA would be reviewed and supplemented, if appropriate, to insure NEPA compliance.

Period for which this EA is Valid. This EA would remain valid until Wisconsin WS and other appropriate agencies determine that new needs for action, changed conditions or new alternatives having different environmental effects must be analyzed. At that time, this analysis and document would be supplemented pursuant to NEPA. Review of the EA would be conducted each year to ensure that the EA analysis is sufficient.

Site Specificity. The purpose for preparing this EA is to determine if the proposed action could have a significant impact on the quality of the human environment, analyze other alternatives, coordinate efforts, inform the public of WS actions, and to comply with NEPA. This EA analyzes the potential impacts of cervid damage management, as coordinated with the WDNR and other state and federal agencies, on all lands in Wisconsin under MOU, Cooperative Agreement, or other comparable document. The EA also addresses the impacts of cervid damage management on areas where additional agreements may be signed in the future. Because the proposed action is to conduct a coordinated cervid damage management program in accordance with plans, goals, and objectives developed by the WDNR and/or WDATCP to reduce damage, and because the program's goals and directives are to provide services when

requested, within the constraints of available funding and workforce, it is conceivable that additional damage management efforts could occur. Thus, this EA anticipates these additional efforts and the analyses are intended to apply to actions that may occur *in any locale* and at *any time* within Wisconsin as part of a coordinated program.

The EA emphasizes major issues as they relate to specific areas whenever possible, however, many issues apply wherever cervid damage, or potential cervid damage occur and the resulting management actions taken. WS personnel use the WS Decision Model (Slate et al. 1992) as the "*on the ground*" site-specific procedure for each damage management action conducted by WS. The Decision Model is a thought process that guides WS through the analysis and development of the most appropriate individual strategy to reduce damages and detrimental environmental effects from damage management actions (see Chapter 3, Section 3.3.5 for a description of the Decision Model). The Decision Model and WS Directive 2.105 describe the site-specific thought process that is used by WS (see USDA 1997, Chapter 2 and Appendix N for a more complete description of the Decision Model and examples of its application). Decisions made using the model would be in accordance with plans, goals, and objectives of the state and any mitigations and standard operating procedures described herein and adopted or established as part of the decision.

WS analyzed the current program and proposed action, and the other alternatives in this EA against the issues that were raised. These issues were analyzed at levels that are "*site specifically*" appropriate for this action in Wisconsin. Determining impacts requires that WS look at the *context* of the issue and *intensity* of the action and impacts. The range of wild deer populations is seldom a few acres or farm but rather over a much larger area that includes different land ownerships and political boundaries. Damage management actions are generally conducted on a much smaller portion of the habitat occupied by deer. As professional wildlife biologists, WS and the WDNR analyze impacts to the deer population, and that the damage situation with deer may change at any time in any location; wildlife populations are dynamic and mobile.

In summary, WS has prepared an EA that provides as much information as possible to address and predict the locations of potential cervid damage management actions and coordinates efforts with the WDNR and/or WDATCP, as appropriate, to insure that deer populations remain healthy and viable in the state. Thus, the EA addresses the substantive environmental issues pertaining to cervid damage management and disease monitoring/surveillance activities in Wisconsin. To reduce damages, along with corrective and preventive direct damage management, WS provides technical assistance and demonstrations to help prevent the need for direct damage management. WS can and does provide an analysis of impacts of their actions and impacts to reduce cervid damage within the scope of the EA. The site-specificity problem occurs when trying to determine the exact location an animal would cause damage before the damage situation occurs. By using the Decision Model, WS believes it meets the intent of NEPA with regard to site-specific analysis and that this is the only practical way for WS to comply with NEPA and still be able to accomplish its mission. WS determined that a more detailed and more site-specific level of analysis would not substantially improve the public's understanding of the proposal, the analysis, the decision-making process, and pursuing a more site-specific and more detailed analysis might even be considered inconsistent with NEPA's emphasis on reducing unnecessary

paperwork (Eccleston 1995). In addition, in terms of considering cumulative impacts, one EA analyzing impacts in Wisconsin may provide a better analysis than multiple EA's covering smaller zones within Wisconsin.

Public Involvement/Notification. As part of this process, and as required by the Council on Environmental Quality (CEQ) and APHIS-NEPA implementing regulations, this document and its Decision are being made available to the public through "Notices of Availability" (NOA) published in local media and through direct mailings to parties that have specifically requested to be notified¹⁴. New issues or alternatives raised after publication of this EA will be fully considered to determine whether the EA should be revisited and, if appropriate, revised.

1.6 AUTHORITY AND COMPLIANCE

1.6.1 USDA-APHIS-Wildlife Services

The USDA is directed by law to protect American agriculture and other resources from damage associated with wildlife. The primary statutory authority for the WS program is the Act of March 2, 1931, as amended (7 U.S. C. 426-426c; 46 Stat. 1468), which provides that:

"The Secretary of Agriculture is authorized and directed to conduct such investigations, experiments, and tests as he may deem necessary in order to determine, demonstrate, and promulgate the best methods of eradication, suppression, or bringing under control on national forests and other areas of the public domain as well as on State, Territory or privately owned lands of mountain lions, wolves, coyotes, bobcats, prairie dogs, gophers, ground squirrels, jackrabbits, brown tree snakes and other animals injurious to agriculture, horticulture, forestry, animal husbandry, wild game animals, furbearing animals, and birds, and for the protection of stock and other domestic animals through the suppression of rabies and tularemia in predatory or other wild animals; and to conduct campaigns for the destruction or control of such animals. Provided that in carrying out the provisions of this Section, the Secretary of Agriculture may cooperate with States, individuals, and public and private agencies, organizations, and institutions."

Since 1931, with the changes in societal values, WS policies and its programs place greater emphasis on the part of the Act discussing "bringing (damage) under control", rather than "eradication" and "suppression" of wildlife populations. In 1988, Congress strengthened the legislative mandate of WS with the Rural Development, Agriculture, and Related Agencies Appropriations Act. This Act states, in part:

"That hereafter, the Secretary of Agriculture is authorized, except for urban rodent control, to conduct activities and to enter into agreements with States, local jurisdictions, individuals, and public and private agencies, organizations, and institutions in the control of nuisance mammals and birds and those mammals and birds species that are reservoirs for zoonotic diseases, and to deposit any money collected under any such agreement into the

¹⁴ It is entirely possible that an urgent need, such as threats to the traveling public could require that action be taken prior to reaching a decision. None of the planners and decision makers involved in this effort is precluded from considering comments filed in this process at any time (even after actions to deal with the threat have begun) and making appropriate adjustments to ongoing program operations.

appropriation accounts that incur the costs to be available immediately and to remain available until expended for Animal Damage Control activities."

Further, in 2001, Congress amended WS authority in the Agriculture Appropriations Bill, which provides that:

"The Secretary of Agriculture may conduct a program of wildlife services with respect to injurious animal species and take any action the Secretary considers necessary in conducting the program. The Secretary shall administer the program in a manner consistent with all of the wildlife services authorities in effect on the day before the date of the enactment of the Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2001."

To fulfill this Congressional direction, WS conducts activities to prevent or reduce wildlife damage to agricultural, industrial and natural resources, property, and threats to public health and safety on private and public lands in cooperation with other federal, state and local agencies, private organizations, and individuals. Therefore, wildlife damage management is not based on punishing animals but as one means of reducing damage, with actions being implemented using the WS Decision Model (Slate et al. 1992). The imminent threat of damage or loss of resources is often sufficient for individual actions to be initiated. The need for action is derived from the specific threats to resources or the public. WS' vision is to improve the coexistence of people and wildlife by providing federal leadership to reduce problems.

1.6.2 Wisconsin Department of Natural Resources Legislative Authority

The WDNR, under the direction of a Governor appointed Natural Resources Board, is specifically charged by the Legislature with the management of the state's wildlife resources. Although legal authorities of the Natural Resources Board and the WDNR are expressed throughout Wisconsin Administrative Code (WAC), the primary statutory authorities include establishment of a system to protect, develop and use the forest, fish and game, lakes, streams, plant life, flowers, and other outdoor resources of the state (s. 23.09 Wis. Stats.) and law enforcement authorities (s. 29.001 and s. 29.921 Wis. Stats.). The Natural Resources Board adopted mission statements to help clarify and interpret the role of WDNR in managing natural resources in Wisconsin. They are:

- To protect and enhance our natural resources: our air, land and water; our wildlife, fish and forests and the ecosystems that sustain all life¹⁵.
- To provide a healthy sustainable environment and a full range of outdoor opportunities.
- To ensure the right of all people to use and enjoy these resources in their work and leisure.
- To work with people to understand each other's views and carry out the public will.
- And in this partnership consider the future and generations to follow.

¹⁵ Primary control of deer disease prevention resides with the WDNR calling into question the value of any federal process in planning and decision-making for this aspect of the program. Still, an educated and involved citizenry can help inform planners and decision-makers at all levels of government. In the circumstances, the best way in which to involve and educate citizens consistent with the State's timeframe of need is through the public NEPA process.

In addition, the Wisconsin legislature passed additional authority to the WDNR to reduce the threat that CWD presents to Wisconsin's free-ranging deer herd. These laws are:

1.6.2.1 2001 Wisconsin "Act 108" to Hunt an Animal with the Aid of an Aircraft

Wisconsin regulation (Wis. Stat 29.307, s. 8) states that: 29.307 (2) (a) (a) notwithstanding sub. (1), a state employee or agent or a federal employee or agent acting within the scope of his or her employment or agency may hunt an animal in the wild with the aid of an aircraft if all of the following apply:

1. The employee or agent is authorized by the Department to take the animal for the purpose of controlling the spread of disease in animals.
2. The employee or agent is hunting in an area designated by the department as a chronic wasting disease eradication zone.
3. The employee or agent is in compliance with all of the rules promulgated under part b. (b) The department shall promulgate rules specifying the conditions under which aircraft may be used for surveillance of animals, for herding animals, and for shooting animals in order to control the spread of disease in animals. The rules may authorize shooting animals only if the department considers all other alternatives to shooting animals from aircraft and determines that the shooting is necessary in order to control the spread of disease in animals.

1.6.2.2 Removal of Wild Animals and Authorization to Remove Wild Animals Causing Damage or Nuisance

Wisconsin regulations (Wis. Stat. 29.885) grants WDNR the authority to authorize the removal of wild animals causing damage or a nuisance. WDNR administrative rule (WAC, Natural Resources (NR) 12.10) is established to administer Wisconsin regulations relating to the removal of wild animals causing damage or nuisance. This administrative rule defines criteria whereby landowner, lessees, or occupants may remove from lands under their control wild animals constituting a nuisance. WS assistance to those requesting assistance in reducing cervid damage, which could involve the removal of white-tailed deer, would be conducted under authority granted to WS, or landowners, lessees, or occupants, by the WDNR.

1.6.2.3 Conditions of permits to shoot or trap wild animals causing damage

WDNR WAC NR 12.15 is established to define conditions of permits issued by the WDNR authorizing shooting or trapping of wild animals causing damage. General provisions for the issuance of such permits include: public use of property during open seasons, refusal of public use, compliance with all other hunting and trapping rules, carcass care and disposition, WDNR assistance in implementing permitted activities, permit kill limit, authorized area, violations and use restrictions, as well as some additional provisions.

1.6.2.4 Conditions of permits to shoot deer causing damage

WDNR WAC NR 12.16 is established to define conditions of permits issued by the WDNR authorizing the take of deer causing damage. The WDNR has the authority to issue permits to shoot deer for nuisance, human health and safety, and agricultural damage. Permits follow regulated procedures for removing deer. Shooting hours, harvest objectives, carcass tag distribution, effective dates, tagging carcasses, transporting carcasses, registering carcasses, carcass distribution, deer type and weapon use are administratively managed by WDNR. WS may recommend, as prescribed abatement, that agricultural producers enrolling in the WDACP be issued a shooting permit for deer causing agricultural damage. Recommended abatement measures must be fulfilled by the enrolled agricultural producer for future program eligibility and monetary damage compensation.

WS cervid damage management activities would be conducted at the request or closely coordinated with the WDNR. Removal of free-ranging deer for CWD surveillance and herd health monitoring would only be conducted after a request from the WDNR has been received and after consultation and coordination with the WDNR.

1.6.3 Wisconsin Department of Agriculture, Trade, and Consumer Protection

The WDATCP, under the direction of a Governor appointed nine member Board of private citizens and Secretary of the WDATCP, is specifically charged by the legislature with providing consumer and business information, handling complaints, providing agricultural development and marketing services, assisting agricultural production and much more. The mission of WDATCP is to serve the citizens of Wisconsin by assuring:

- The safety and quality of food
- Fair business practices for the buyer and seller
- Efficient use of agricultural resource in a quality environment
- Consumer protection
- Healthy animals and plants
- The vitality of Wisconsin agriculture and commerce

WDATCP administers many laws. Most of them are found in chapters 88 to 100, 126 and 136 of the Wisconsin Statutes. WDATCP has adopted rules to implement these laws. WDATCP rules are found in the WAC, Chapters ATCP 1 to ATCP 162. DATCP rules have the full force and effect of law.

WS captive cervid damage management activities would be conducted at the request or closely coordinated with the WDATCP. Removal of captive cervids for herd health monitoring would only be conducted after a request from the WDATCP has been received and after consultation and coordination with the WDATCP.

1.6.4 USDA Forest Service

The Forest Service has the responsibility to manage the resources of federal lands for multiple uses including livestock grazing, timber production, recreation and wildlife habitat, while recognizing the state's authority to manage wildlife populations. The Forest Service recognizes the importance of reducing wildlife damage on lands and resources under their jurisdiction, as

integrated with their multiple use responsibilities. For these reasons, the Forest Service has entered into MOUs with WS to facilitate a cooperative relationship. Copies of these MOUs are available by contacting the WS State Director's Office at 750 Windsor Street, Room 101, Sun Prairie, Wisconsin 53590.

1.6.5 U.S. Fish and Wildlife Service

The USFWS is charged with implementation and enforcement of the ESA. The USFWS cooperates with the WDNR and WS by recommending measures to avoid or minimize take of T/E species. The term "take" is defined by the ESA (section 3(19)) to mean "*to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.*" The terms "harass" and "harm" have been further defined by USFWS regulations (50 CFR section 17.3), as follows: 1) *harass means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering;* 2) *harm means an act which actually kills or injures wildlife. Such acts may include significant habitat modification or degradation when it actually kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding or sheltering.*

1.6.6 Compliance with Federal Laws

WS consults and cooperates with other federal and state agencies as appropriate to ensure that all WS activities are carried out in compliance with all applicable federal laws.

National Environmental Policy Act: All federal actions are subject to NEPA (Public Law 91-190, 42 U.S.C. 4321 et seq.). WS follows the CEQ regulations implementing NEPA (40 CFR 1500 et seq.), USDA (7 CFR 1b), and the APHIS Implementing Guidelines (7 CFR 372) as a part of the decision-making process. These laws, regulations, and guidelines generally outline five broad types of activities to be accomplished as part of any project: public involvement, analysis, documentation, implementation, and monitoring. NEPA also sets forth the requirement that all major federal actions be evaluated in terms of their potential to significantly affect the quality of the human environment for the purpose of avoiding or, where possible, mitigating and minimizing adverse impacts. Federal activities affecting the physical and biological environment are regulated in part by CEQ through regulations in (40 CFR, Parts 1500-1508). In accordance with CEQ and USDA regulations, APHIS Guidelines Concerning Implementation of NEPA Procedures, as published in the Federal Register (44 CFR 50381-50384) provide guidance to APHIS regarding the NEPA process.

Pursuant to NEPA and CEQ regulations, this EA documents the analysis of a proposed federal action's impact, informs decision-makers and the public of reasonable alternatives capable of avoiding or minimizing adverse impacts, and serves as a decision-aiding mechanism to ensure that the policies and goals of NEPA are infused into federal agency actions. This EA was prepared by integrating as many of the natural and social sciences as warranted based on the potential effects of the proposed action. The direct, indirect, and cumulative impacts of the proposed action are analyzed.

Endangered Species Act (ESA): Under the ESA, all federal agencies are charged with a responsibility to conserve endangered and threatened species and to utilize their authorities in furtherance of the purposes of the ESA (Sec.2(c)). WS conducts Section 7 consultations with the USFWS to utilize the expertise of the USFWS to ensure that, "*Any action authorized, funded or carried out by such an agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species . . .*" (Sec.7 (a) (2)). WS conducts formal Section 7 Consultations with the USFWS at the national level and consultations with the USFWS at the local level as appropriate.

National Historical Preservation Act (NHPA) of 1966 as amended: The NHPA requires federal agencies to: 1) evaluate the effects of any federal undertaking on cultural resources, 2) consult with the State Historical Society regarding the value and management of specific cultural, archaeological and historic resources, and 3) consult with appropriate American Indian tribes to determine whether they have concerns for traditional cultural resources in areas of these federal undertakings. In conjunction with preparation of this EA, WS consulted with the Wisconsin State Historical Society and received that office's concurrence that WS' proposed activities would be unlikely to have any adverse effects on cultural, archeological, or historic resources (R. Dexter, WI-SHPO, pers. comm. 2002). WS also sought input from the Red Cliff, Lac Courte Oreilles, Bad River, Lac du Flambeau, St. Croix, and Sokaogon Chippewa Bands, Ho Chunk Nation, Menominee, Oneida, Forest County Potowatomi, and Stockbridge-Munsee Band of Mohican Indians and the Great Lakes Indian Fish and Wildlife Commission. None of these entities identified or provided any cultural or other concerns relating to WS current or proposed program. In most cases, cervid damage management has little potential to cause adverse effects to sensitive cultural resources. The areas where cervid damage management would be conducted are small; pose minimal ground disturbance, nor adverse wildlife population impacts. In addition, any WS activities conducted on tribal lands would only be conducted at the request of the tribe and after appropriate authorizing documents were signed.

Executive Order 12898 - Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations: Environmental Justice (EJ) is a movement promoting the fair treatment of people of all races, income and culture with respect to the development, implementation and enforcement of environmental laws, regulations and policies. Fair treatment implies that no person or group of people should endure a disproportionate share of the negative environmental impacts resulting either directly or indirectly from the activities conducted to execute this country's domestic and foreign policies or programs. EJ has been defined as the pursuit of equal justice and equal protection under the law for all environmental statutes and regulations without discrimination based on race, ethnicity, or socioeconomic status.

All WS activities are evaluated for their impact on the human environment and compliance with Executive Order 12898 to ensure EJ. WS personnel use wildlife damage management methods as selectively and environmentally conscientiously as possible. All chemicals used by WS are regulated by the EPA through Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), by the WDATCP, and by WS Directives. Based on a thorough Risk Assessment, APHIS concluded that when WS program chemicals are used following label directions, they are selective to target individuals or populations and such use has negligible impacts on the environment (USDA 1997,

Appendix P). The WS operational program, analyzed in this document, properly disposes of any excess solid or hazardous waste. It is not anticipated that the proposed action would result in any adverse or disproportionate environmental impacts to minority or low-income persons or populations.

Executive Order 13045 - Protection of Children from Environmental Health and Safety Risks:

Children may suffer disproportionately from environmental health and safety risks, including their developmental physical and mental status, for many reasons. Because WS makes it a high priority to identify and assess environmental health and safety risks, WS has considered the impacts that alternatives analyzed in this EA might have on children. All WS cervid damage management is conducted using only legally available and approved damage management methods where it is highly unlikely that children would be adversely affected.

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CHAPTER 2: ISSUES AND AFFECTED ENVIRONMENT

2.1 AFFECTED ENVIRONMENTS

2.1.1 Airports

Of all wildlife species, free-ranging deer are ranked as the most hazardous to aircraft, especially to smaller general aviation aircraft (Dolbeer et al. 2000), and they represent a serious threat to human safety when found on airport properties. Airports are often secured areas with chain-link security fencing. Sometimes deer gain entrance into these airports where there is adequate cover and food, and they live there for all or part of the year. Because deer are ever-present throughout Wisconsin, it is possible for deer to be at nearly any airport in the state.

2.1.2 Federally Owned Properties

Federal properties such as military reservations typically restrict public access. These same property managers are sometimes unaware or unconcerned with the presence of free-ranging deer until the herd is large enough to impact the vegetation present, operation of the facility, the health of personnel and families, and/or the health of the herd itself. When the local deer population exceeds population goals on federal properties, WS assistance to reduce human health risks, reduce property damage, or maintain herd health may be requested.

2.1.3 Urban and Suburban Areas

Public and private properties in urban/suburban areas may also be affected when deer cause damage to landscaping, natural resources, and are involved in collisions with vehicles.

2.1.4 Agricultural, Rural and Forested Areas

Other areas of proposed action include farms, forested areas, nurseries, and rural areas where free-ranging deer are causing or potentially cause damage to agriculture crops, livestock feed, damage trees by antler rubbing, or disease transmission.

2.2 ISSUES ANALYZED IN DETAIL

The following issues that have been identified as areas of concern requiring detailed analysis in Chapter 4 of this EA:

- Effects on Free-Ranging White-tailed Deer Populations
- Effects on Plants and Other Wildlife Species, including T/E Species.
- Effects on Human Health and Safety
- Humaneness of Methods to be Used
- Effects on Aesthetic Values
- Effects on Regulated White-tailed Deer Hunting

2.2.1 Effects on Free-ranging White-tailed Deer Populations

There are concerns that the proposed action or any of the alternatives analyzed in this EA could result in the loss of free-ranging white-tailed deer populations or could have a cumulative adverse impact on regional or statewide populations. Whitetail deer have incredible reproductive potential. Under good circumstances, does two years old or older bear twins annually and fawns breed at the age of 5 - 6 months, giving birth to single fawns as yearlings. On excellent range, mature does can bear triplets and the survival of all fawns is greatly improved. Given abundant food supplies, mild winters, and an absence of predation and hunting, this kind of reproduction can result in a deer herd almost doubling its size in one year.

Many factors influence the size of the deer population in a given area. These factors include the amount of food available throughout the year, the severity of winter, the presence of adequate cover, the number of deer killed during the hunting season, the density of roads and vehicles, and the concentration of predators. While all these factors have an impact on the deer population, wildlife managers use hunting as the primary tool for keeping deer populations below carrying capacity.

WS actions would be coordinated with the WDNR to reduce agricultural, natural resource or property damage, reduce risks to wildlife, or to reduce threats to human health and safety with relatively few deer being removed from populations and thus resulting in no affect on populations (see Section 4.2 of this EA). However, the WDNR could request WS to assist in herd health management, specifically for CWD monitoring and surveillance, and deer could be eradicated or populations greatly reduced from localized areas infected with CWD (WDNR 2003). These reductions would be expected to last for the duration of the disease management efforts (currently estimated at 5 years) and subsequently repopulation of the area would occur (WDNR 2003). The area of greatest reductions, the CWD Intensive Harvest Zone, is currently relatively small, less than 2% of the State's land area (WDNR 2003). For CWD, WS actions would be conducted in cooperation and after consultation with the WDNR and/or WDATCP, and actions would be taken to reduce damage, disease risks or improve the health of cervid herds.

2.2.2 Effects on Plants and other Wildlife Species, including T/E Species

There are concerns among members of the public and wildlife professionals, including WS, that there is the potential for damage management methods used in the proposed action or any of the action alternatives to inadvertently capture or harm non-target animals or potentially cause adverse affects to non-target species populations, particularly T/E species. WS operational damage management would only be conducted in cooperation and after consultation with the appropriate state and federal agencies and only on areas under agreement.

Special efforts are made to avoid adversely affecting T/E Species through consultation with the USFWS and WDNR via biological assessments of the potential effects and the establishment of restrictions, standard operating procedures (SOPs) or mitigation measures. WS has consulted with the USFWS under Section 7 of the ESA concerning potential impacts of wildlife damage management methods on T/E species and has obtained a Biological Opinion (BO) (USDA 1997, Appendix F). In addition, Wisconsin WS has received concurrence from the USFWS and the WDNR with a determination that the proposed action would not likely adversely affect T/E

species found in Wisconsin (J. Smith, USFWS letter to D. Nelson, WS, May 22, 2003, S. Holtz, WDNR letter to D. Nelson, WS, May 12, 2003, L. Lewis, USFWS letter to G. Larson, WS, May 9, 2001).

Some people are also concerned about the damaging effects that deer could have on native vegetation and fauna. These people are concerned as to whether the proposed action or any of the alternatives would reduce such damage to acceptable levels. As addressed in Section 1.1, the biological carrying capacity is the maximum number of animals that an area of land can support over a prolonged period. At biological carrying capacity, the deer herd will not be healthy. A herd this size will also tend to damage surrounding plant communities. When a deer population is well below carrying capacity, the deer are well fed and healthy. Plant communities are also much less likely to be damaged when deer populations are below the carrying capacity. However, a deer herd density below biological carrying capacity can in some situations adversely affect native vegetation and fauna.

At current deer densities, some tree regeneration and browse-sensitive plants have been suppressed resulting in secondary negative impacts on ground and shrub-nesting birds and possible small mammals (WDNR 2003). Negative effects on native ecosystems associated with too few white-tailed deer have not been described or demonstrated in the scientific literature (WDNR 2003).

2.2.2.1 Aerial Gunning Concerns in Relation to Disturbance of Livestock and Wildlife

Most livestock in Wisconsin are maintained near or in buildings during the time of year when WS would conduct aerial gunning activities. By maintaining livestock in or near buildings, they would be sheltered from most low-flying aircraft disturbance. In addition, livestock that are maintained in close proximity to people soon become acclimated to noises and other stimuli (i.e., running engines, vehicle horns, banging doors, lights) similar to what could be expected from aerial gunning. Additionally, in many of the areas where WS would conduct aerial gunning activities, other aircraft (i.e., National Guard helicopters, commercial and private aircraft) routinely fly over the areas. Therefore, any WS aerial gunning should have minimal effects on livestock. Further, WS personnel are directed to avoid areas with livestock, unless it would compromise their mission and would leave the areas as soon as possible if a disturbance was detected.

A number of studies have looked at responses of various wildlife species to aircraft overflights USDI (1995). USDA (1995) revealed that a number of studies have documented responses by certain wildlife species that suggest indirect adverse affects could occur. However, few if any studies have proven that aircraft overflights cause significant adverse impacts on individuals or populations, although the report stated it is possible to draw the conclusion that affects to wildlife populations could occur. It appears that some species will frequently or at least occasionally show adverse responses to even minor overflight occurrences. In general, however, it appears that the more serious potential adverse affects occur when overflights are *chronic* (i.e., they occur daily or more often over long periods of time). Chronic exposure situations generally involve areas near commercial airports and military flight training facilities. WS proposes to use

limited aerial gunning after consultation and coordination with the WDNR, WDATCP and/or USFWS, as appropriate in relatively rural areas where visibility of target animals from the air is good.

Some examples of species or species groups that have been studied with regard to this issue and WS' determination of potential adverse affects from aerial gunning overflights are as follows:

- Colonial Waterbirds. Kushlan (1979) reported that low level (390 feet followed by a second flight at 200 feet) overflights of 2-3 minutes in duration by a fixed-wing airplane and a helicopter produced no "drastic" disturbance of tree-nesting colonial waterbirds, and, in 90% of the observations, the individual birds either showed no reaction or merely looked up. WS aircraft are unlikely to be flown over such species in Wisconsin because most aerial gunning operations would not occur near tree-nesting colonial waterbirds. Even if an overflight of a nesting colony occurred, it is apparent that little or no disturbance would result.
- Greater Snow Geese. Belanger and Bedard (1989, 1990) observed responses of greater snow geese (*Chen caerulescens atlantica*) to man-induced disturbance on a sanctuary area and estimated the energetic cost of such disturbance. They observed that disturbance rates exceeding two per hour reduced goose use of the sanctuary by 50% the following day. They also observed that about 40% of the disturbances caused interruptions in feeding that would require an estimated 32% increase in nighttime feeding to compensate for the energy lost. They concluded that overflights of sanctuary areas should be strictly regulated to avoid adverse impacts. WS aerial gunning flights would rarely, if ever, occur over concentrations of greater snow geese. In addition, most WS flights would occur when vegetative ground cover is low; at times when geese would be out of the area. Thus, disturbance of migrating snow geese or any other waterfowl should be minimal to nonexistent.
- Cervids. Krausman et al. (1986) reported that only three of 70 observed responses of mule deer to small fixed-wing aircraft overflights at 150 to 500 feet above ground resulted in the deer changing habitats. The authors believed that the deer may have been accustomed to overflights because the study area was near an interstate highway which was followed frequently by aircraft. Mule deer are frequently seen from WS aircraft in western states and are sometimes temporarily disturbed as evidenced by their running and avoidance behavior. However, it is apparent that indirect adverse effects from this type of disturbance are minimal. VerCauteren and Hygnstrom (2002) noted when studying the efficacy of hunting to manage deer populations, that when deer were flown over during their censuses, they typically just stood up from their beds but did not flush. In addition, WS aerial gunning personnel frequently observe deer and antelope (*Antilocapra americana*) standing apparently undisturbed beneath or just off to one side of aircraft. In areas exposed to periodic low-level aircraft activity, animals seem to acclimate to low flying aircraft to the point that disturbance is unapparent (B. Mytton, formerly WDNR, pers. comm. 2002).

- Mountain Sheep. Krausman and Hervert (1983) reported that, of 32 observations of the response of mountain sheep (*Ovis canadensis*) to low-level flights by small fixed-wing aircraft, 60% resulted in no disturbance, 81% in no or "slight" disturbance, and 19% in "great" disturbance. The authors concluded that flights less than 150 feet above ground can cause mountain sheep to leave an area. Wisconsin WS would not conduct any aerial gunning in mountain sheep habitat.
- Bison. Fancy (1982) reported that only two of 59 bison (*bison*) groups showed any visible reaction to small fixed-wing aircraft flying at 200 - 500 feet above ground. The study indicated bison are relatively tolerant of aircraft overflights.
- Raptors. Andersen et al. (1989) conducted low-level helicopter overflights directly at 35 red-tailed hawk (*Buteo jamaicensis*) nests and concluded their observations supported the hypothesis that red-tailed hawks habituate to low level flights during the nesting period. Their results also showed similar nesting success between hawks subjected to such overflights and those that were not. Military jets that flew low over the study area during training exercises did not appear to bother the hawks, and neither were they alarmed when the researchers flew within 100 feet in a small fixed-wing aircraft (White and Thurow 1985). White and Sherrod (1973) suggested that disturbance of raptors by aerial surveys with helicopters may be less than that caused by approaching nests on foot. Ellis (1981) reported that five species of hawks, two falcons, and golden eagles were "incredibly tolerant" of overflights by military fighter jets, and observed that, although birds frequently exhibited alarm, negative responses were brief and never limiting to productivity. These studies indicate that overflights by WS aircraft should have no significant adverse impacts on nesting raptor populations.

WS' SOPs include measures intended to mitigate or reduce the effects on non-target species populations are described in Section 3.6 of this EA. To reduce the risks of adverse affects to non-target species, WS would select damage management methods that are as target-selective as possible or apply such methods in ways to reduce the likelihood of negatively affecting non-target species.

2.2.3 Effects on Human Health and Safety

A concern among some people is whether the proposed action or any of the action alternatives pose an increased threat to public and pet health and safety. In particular, deer removal methods (i.e., trapping, shooting and use of an aircraft) may be hazardous to people and pets. Another concern is that high deer populations pose a threat to human health and safety from deer-vehicle collisions, deer-aircraft collisions, and the spread of disease (WDNR 2003).

2.2.3.1 Aerial Gunning Safety Concerns

The following information on aerial safety was obtained from Mr. Norm Wiemeyer, Chief, Denver Field Office of the National Transportation Safety Board (NTSB) (the agency that investigates aviation accidents):

Major Ground or Forest Fires: Mr. Wiemeyer stated he had no recollection of any major fires caused by government aircraft since he has been in his position beginning in 1987.

Fuel Spills and Environmental Hazard from Aviation Accidents: The NTSB stated that aviation fuel is extremely volatile and will evaporate within a few hours or less to the point that even its odor cannot be detected (N. Wiemeyer, NTSB, pers. comm. 1998). Jet A fuel also does not pose a large environmental problem if spilled. This is because Jet A is a straight chained hydrocarbon with little benzene present and microbes would quickly break-down any spill by aerobic action (J. Kuhn, Montana Department of Environmental Quality, pers. comm. 1998). The fuel quantities involved in WS' aircraft accidents are small (generally less than 55 gallons) and less than many vehicles traveling Wisconsin highways. In some cases, not all of the fuel is spilled. Thus, there would be little environmental hazard from un-ignited fuel spills caused by WS aircraft (T. Amman, WDNR, pers. comm. 2003).

Oil and Other Fluid Spills: For privately owned aircraft, the aircraft owner or his/her insurance company is responsible for cleanup of spilled oils and other fluids if required by the owner or manager of the property on which the accident occurred. With the size of aircraft used by WS, the quantities of oil (i.e., 3-5 quarts for turbine engines) capable of being spilled in any accident are small and insignificant with respect to the potential for environmental damage. Aircraft used by WS are single engine models, so the greatest potential amount of oil that could be spilled in one accident would be about 5 quarts.

Petroleum products biodegrade through volatilization and bacterial action, particularly when exposed to oxygen (Environmental Protection Agency (EPA) 2000). Thus, small quantity oil spills on surface soils can be expected to biodegrade readily. Even in subsurface contamination situations involving underground storage facilities which would generally be expected to involve larger quantities than would ever be involved in a small aircraft accident, EPA guidelines provide for "natural attenuation" or volatilization and biodegradation in some situations to mitigate environmental hazards (EPA 2000). Thus, even where oil spills in small aircraft accidents are not cleaned up, the oil does not persist in the environment or persists in such small quantities that there is no problem. Also, WS' accidents generally would occur in areas away from human habitation and drinking water supplies. Thus, the risk to drinking water appears to be exceedingly low or nonexistent.

An informal polling of WS' State Directors affirms that no major ground fires have resulted from WS' aviation accidents. For these reasons, the risk of ground fires or fuel/oil pollution from aviation accidents is considered low. In addition, based on the history and experience of the program in aircraft accidents, it appears the risk of significant environmental damage from such accidents is exceedingly low.

2.2.3.2 Firearm Safety Concerns

Shooting and aerial gunning could prove to be important methods to assist in the monitoring, managing and maintaining a healthy free-ranging deer herd in Wisconsin. It is the policy of WS that safety of WS employees and the public is of primary importance when program employees use firearms to accomplish their official duties. The use of firearms is a public safety concern

related to the potential misuse. Most hunting accidents involve self-inflicted injuries or hunters accidentally shooting their partners (WDNR 2003). It is an extremely rare event for non-hunters, livestock, or pets to be shot by a deer hunter, even when more than 600,000 hunters are in the woods on the traditional opening weekend of deer season in Wisconsin.

WS use and possession of firearms would be in accordance with all federal, state, and local laws and regulations and/or authorized and applicable exemptions. In addition, WS cervid damage management activities using firearms would be conducted in accordance with WS programmatic firearms use policies, Wisconsin WS firearms use and shooting policies and procedures, and WDNR permitting requirements. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as set forth in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. All WS aerial gunning operations are required to comply with WS Directive 2.620 and the WS Aviation Policy Manual, and all aircraft, pilots and aerial gunners must be certified by the WS Aviation Manager.

2.2.4 Humaneness of Methods to be Used

The issue of humaneness, as it relates to the killing or capturing of wildlife is an important but complex concept. Kellert and Berry (1980) in a survey of American attitudes toward animals related that 58% of their respondents, "*... care more about the suffering of individual animals . . . than they do about species population levels.*" Schmidt (1989) indicated that vertebrate pest control for societal benefits could be compatible with animal welfare concerns, if "*... the reduction of pain, suffering, and unnecessary death is incorporated in the decision making process.*"

Suffering has been described as a "*... highly unpleasant emotional response usually associated with pain and distress.*" However, suffering "*... can occur without pain . . .*," and "*... pain can occur without suffering . . .*" (American Veterinary Medical Association (AVMA) 1986). Because suffering carries with it the implication of a time frame, a case could be made for "*... little or no suffering where death comes immediately . . .*" (California Department of Fish and Game (CDFG) 1999), such as with WS shooting.

Defining pain as a component of humaneness may be a greater challenge than that of suffering. Pain obviously occurs in animals. Altered physiology and behavior can be indicators of pain, and identifying the causes that elicit pain responses in humans would "*... probably be causes for pain in other animals . . .*" (AVMA 1986). However, pain experienced by individual animals probably ranges from little or no pain to significant pain (CDFG 1999). Some WS damage management methods such as traps and snares may thus cause varying degrees of pain in different animal species for varying time frames. At what point pain diminishes or stops under these types of restraint has not been measured by the scientific community.

Pain and suffering as it relates to a review of WS damage management methods to capture animals, has both a professional and lay point of arbitration. Wildlife managers and the public would both be better served to recognize the complexity of defining suffering, since "... *neither medical nor veterinary curricula explicitly address suffering or its relief*" (CDFG 1999).

Research suggests that with some methods, such as restraint in traps, changes in the blood chemistry of trapped animals indicate "*stress*" (USDA 1997: 3-81). However, such research has not yet progressed to the development of objective, quantitative measurements of pain or stress for use in evaluating humaneness.

Thus, the decision-making process involves tradeoffs between the above aspects of pain and humaneness. An objective analysis of this issue must consider not only the welfare of wild animals but also the welfare of humans if damage management methods were not used. Therefore, in part, humaneness appears to be a person's perception of harm or pain inflicted on an animal, and people may perceive the humaneness of an action differently. The challenge in coping with this issue is how to achieve the least amount of suffering with the constraints imposed by current technology and funding.

WS has improved the selectivity and humaneness of management devices through research and is striving to bring new findings and products into practical use. Until new findings and products are found practical, a certain amount of animal suffering could occur when some methods are used in those situations when non-lethal damage management methods are not practical or effective.

Wisconsin WS personnel are experienced and professional in their use of management methods so that they are as humane as possible under the constraints of current technology and funding. Mitigation and SOPs used to maximize humaneness are listed in Section 3.6 of this EA. As appropriate, WS euthanizes live animals by methods recommended by the AVMA (Beaver et al. 2001) or the recommendations of a veterinarian, even though the AVMA euthanasia methods were developed principally for companion animals and slaughter of food animals, and not for free-ranging wildlife.

2.2.5 Effects on Aesthetic Values

The human attraction to animals has been well documented throughout history and started when humans began domesticating animals. The American public is no exception and today a large percentage of households have pets. However, some people may consider individual wild animals and birds as "pets" or exhibit affection toward these animals, especially people who enjoy coming in contact with wildlife. Therefore, the public reaction is variable and mixed to wildlife damage management because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to manage conflicts/problems between humans and wildlife.

There is some concern that the proposed action or the action alternatives would result in the loss of aesthetic benefits to the public, resource owners, or neighboring residents. Wildlife generally is regarded as providing economic, recreational, and aesthetic benefits (Decker and Goff 1987),

and the mere knowledge that wildlife exists is a positive benefit to many people. Aesthetics is the philosophy dealing with the nature of beauty, or the appreciation of beauty. Therefore, aesthetics are truly subjective in nature, dependent on what an observer regards as beautiful.

Wildlife populations provide a range of social and economic benefits (Decker and Goff 1987). These include direct benefits related to consumptive and non-consumptive use (e.g., wildlife-related recreation, observation, harvest, sale), indirect benefits derived from vicarious wildlife related experiences (e.g., reading, television viewing), and the personal enjoyment of knowing wildlife exists and contributes to the stability of natural ecosystems (e.g., ecological, existence, bequest values) (Bishop 1987). Direct benefits are derived from a user's personal relationship to animals and may take the form of direct consumptive use (using up the animal or intending to) or non-consumptive use (viewing the animal in nature or in a zoo, photography) (Decker and Goff 1987). Indirect benefits or indirect exercised values arise without the user being in direct contact with the animal and come from experiences such as looking at photographs and films of wildlife, reading about wildlife, or benefiting from activities or contributions of animals such as their use in research (Decker and Goff 1987). Indirect benefits come in two forms: bequest and pure existence (Decker and Goff 1987). Bequest is providing for future generations and pure existence is merely knowledge that the animals exist (Decker and Goff 1987).

Wisconsin WS recognizes that all wildlife has aesthetic value and benefit. WS would only conduct cervid damage management at the request of the affected home/property owner or resource manager. If WS received requests from an individual or WDNR official for cervid damage management, WS would address the issues/concerns being expressed and consideration would be made to explain the reasons why the individual damage management actions would be necessary. Management actions would be carried out in a caring, humane, and professional manner.

2.2.6 Effects on Regulated White-tailed Deer Hunting

Some people may be concerned that WS' cervid damage management activities would affect regulated deer hunting by significantly reducing local deer populations. WS cervid damage management would only be conducted after consultation and close coordination with the WDNR, WDATCP and/or USFWS as appropriate. In addition, WS proposes to only conduct damage management activities after a request is received from resource owners/managers when deer are causing damage, threats of damage or injury, or for herd health¹⁶. Deer populations could be reduced in localized areas for CWD management (WDNR 2003) but those affects would only last as long as the management actions occurred. Other damage management conducted by WS to reduce agricultural damage or reduce the threat to human health and safety would not substantially reduce deer populations or hunting opportunities.

2.3 ISSUES NOT CONSIDERED IN DETAIL WITH RATIONALE

¹⁶ Actions to reduce cervid damage are within the control of Wisconsin State agencies; however APHIS may provide limited assistance to the State in their management efforts. Therefore, Wisconsin State agencies could take action independent of WS or other Federal agencies. Primary control for wildlife management resides with the State of Wisconsin, thus calling into question the value of any Federal process in planning and decision making for a cervid damage management program.

2.3.1 WS' Impact on Biodiversity

WS operates according to international, federal, and state laws and regulations (and management plans thereof) enacted to ensure species viability. In addition, any reduction of a local population or group is frequently temporary because immigration from adjacent areas or reproduction replaces the animals removed. The impacts of the current WS program on biodiversity are minor and not significant nationwide, statewide, or region wide (USDA 1997). WS operates on an extremely small percentage of the land area of the State (during FY 99, 00, 01, and 02 WS conducted operational cervid damage management activities on only eight farms encompassing 2058 acres, or less than about 0.006% of the State and on some additional acreage at the request of the WDNR for CWD surveillance and monitoring purposes), and the WS take of deer as described in this EA is a small proportion of the total population and insignificant to the viability of the population. Further, WS' cervid damage management would be conducted in close coordination and after consultation with the WDNR, WDATCP and/or USFWS primarily for the protection of resources, other species and the health of the Wisconsin deer herd.

2.3.2 Cervid Carcass and Tissue Disposal

The WDNR is charged by the Wisconsin Legislature with the responsibility to manage the state's wildlife resources. Their primary statutory authorities include establishment of a system to protect, develop and use forest, fish and game, lakes, streams, plant life, flowers, and other outdoor resources of the state (s. 23.09 Wis. Stats.) and law enforcement authorities (s. 29.001 and s. 29.921 Wis. Stats.). The WDNR has established the methods and procedures for disposal for CWD infected deer carcasses and any tissues collected for sampling for disease surveillance or waste disposal (WDNR 2003). The WDNR, in conjunction with representatives of the Wisconsin Department of Health and Family Services, the Wisconsin Veterinary Diagnostic Lab, WDATCP, reviewed the available information on CDW and considered environmental and social considerations to deer carcasses disposal (WDNR 2003). It is the intent of WS and the WDNR to minimize any environmental effects from deer disposal and WS would comply with the disposal methods the WDNR deems appropriate to insure no unnecessary environmental or health risks.

2.3.3 Appropriateness of Preparing an EA (Instead of an EIS) For Such a Large Area

Some individuals might question whether preparing an EA for an area as large as the state of Wisconsin would meet the NEPA requirements for site specificity. If in fact a determination is made through this EA that the proposed action would have a significant environmental impact, then an EIS would be prepared. In terms of considering cumulative impacts, one EA analyzing impacts for the entire state may provide a better analysis than multiple EA's covering smaller zones. In addition, Wisconsin WS only conducts deer damage management in a very small area of the State where damage is occurring or likely to occur.

CHAPTER 3: ALTERNATIVES

3.1 INTRODUCTION

This chapter consists of six parts: 1) an introduction, 2) description of alternatives considered and analyzed in detail including the Proposed Action (Alternative 2), 3) a description of IWDM, 4) cervid damage management methods available for use or recommended by WS in Wisconsin, 5) alternatives considered but not analyzed in detail, with rationale, and 6) mitigation measures and SOPs for cervid damage management.

Alternatives were developed for consideration using the WS Decision Model (Slate et al. 1992), "Methods of Control" (USDA 1997, Appendix J) and the "Risk Assessment of Wildlife Damage Control Methods Used by the USDA Animal Damage Control Program" (USDA 1997, Appendix P).

The four alternatives analyzed in detail are:

- Alternative 1 – Current Cervid Damage Management Assistance Program (No Action)
- Alternative 2 – Adaptive Integrated Cervid Damage Management Program (Proposed Action)
- Alternative 3 – Non-lethal Only Cervid Damage Management by WS
- Alternative 4 – No Cervid Damage Management by WS

3.2 ALTERNATIVES CONSIDERED IN DETAIL, INCLUDING THE PROPOSED ACTION

3.2.1 Alternative 1. Current Cervid Damage Management Assistance Program (No Action)

The No Action alternative is a procedural NEPA requirement (40 CFR 1502.14(d)), is a viable and reasonable alternative that could be selected, and serves as a baseline for comparison with the other alternatives. The No Action Alternative, as defined here, is consistent with Council on Environmental Quality (CEQs) definition (CEQ 1981).

Overview

The Current Program primarily responds to requests with technical assistance in dealing with deer damage conflicts. In addition, the Current Program also includes minimal methods development for assessing deer damage, evaluating methods of reducing deer damage, minimal assistance to airports in removing deer that may pose a threat to air-safety, and minimal assistance to the WDNR in assessing the health of Wisconsin's free-ranging deer herd. WS' previous involvement with the WDNR has been limited to assisting in the collection of 52 deer for disease surveillance under the WDNR's authority. Actions conducted to provide these services were implemented in close cooperation and consultation with the WDNR. Technical assistance would continue to be provided, but only limited operational assistance would be provided. Individuals receiving assistance might choose to implement WS recommendations,

implement methods not recommended by WS, use contractual services of private businesses, or take no action. Appendix B describes methods recommended by WS under this alternative.

3.2.2 Alternative 2. Adaptive Integrated Cervid Damage Management Program (Proposed Action)

Under this alternative, WS would administer an adaptive IWDM program to alleviate cervid damage to agriculture, property, natural resources, and human health and safety, and to assist state and other federal agencies in monitoring, managing and maintaining the health of Wisconsin's free-ranging deer herd. In addition, WS would assist the WDATCP in assessing the health of captive cervids and potentially depopulate infected herds. WS' roles under this alternative would be coordinated with the WDNR and WDATCP to reduce damages to agriculture, property, natural resources, and human health and safety, and to assistance with research, surveillance, disease/herd management, communications, information dissemination, and education for the state's CWD Management Plan (WDNR et al., in press). WS' role would involve an expansion of the current WS involvement, in that current sampling, technical assistance, and information dissemination would increase commensurate with program need. Most of these activities generate minimal environmental impacts. The primary environmental issues under this alternative relate to operational damage management and cervid disease management. The surveillance and sampling efforts would be commensurate with WDNR and/or WDATCP program goals for deer management, including depopulation of captive infected cervid herds and free-ranging white-tailed deer in eradication zones. The number of free-ranging deer removed by WS would be determined by the WDNR, but this effort is expected to occur primarily in eradication zones and adjacent management areas. There may also be some removal associated with surveillance at locations where data are lacking. The number of captive cervids removed by WS would be determined by WDATCP. The accepted means of carcass and tissue disposal will be determined by the WDNR and/or other State or federal agencies (See Section 2.3.2).

An adaptive IWDM approach would be implemented on all lands of Wisconsin in coordination with the WDNR and WDATCP where a need exists, a request is received, and funding is available. An IWDM strategy would be recommended and used, encompassing the use of practical and effective methods of preventing or reducing damage while minimizing harmful effects of damage management measures on humans, other species, and the environment. Under this action, WS would provide technical assistance and operational damage management, including non-lethal and lethal management methods by applying the WS Decision Model (Slate et al. 1992). When appropriate, habitat modifications, harassment, repellents, and physical exclusion could be recommended and utilized to reduce deer damage. In other situations, deer would be removed as humanely as possible by live capture followed by euthanasia and/or relocation, under permits issued by the WDNR and/or in cooperation with WDATCP, or shooting. In determining the damage management strategy, preference would be given to practical and effective non-lethal methods. However, non-lethal methods may not always be applied as a first response to each damage situation. The most appropriate response could often be a combination of non-lethal and lethal methods, or there could be instances where application of lethal methods alone would be the most appropriate strategy. In situations where requested, WS could assist the requester in assessing the health of a captive or free-ranging deer herd and in

managing the health of a captive or free-ranging deer herd. Cervid damage management would be conducted in the state, when requested, after an *Agreement for Control* or other comparable document has been completed and funding is available. All cervid damage management would be consistent with other uses of the area and would be coordinated with the WDNR WDATCP and/or USFWS, as appropriate. Appendix B describes a number of methods available for recommendation and use by WS under this alternative.

3.2.3 Alternative 3. Non-lethal Only Cervid Damage Management by WS

This alternative would require WS to use and recommend only non-lethal methods to resolve all cervid damage problems. In addition, WS could not assist other agencies, including the WDNR or WDATCP, in monitoring and assisting manage the health of Wisconsin's free-ranging deer herd or captive herds if it is necessary to use lethal management methods. Requests for information regarding lethal management approaches would be referred to the WDNR, local animal control agencies, or private businesses or organizations. Persons receiving deer damage could still resort to lethal methods or other methods not recommended by WS, use contractual services of private businesses that are available to them, or take no action. Appendix B describes a number of non-lethal methods recommended and used by WS under this alternative.

3.2.4 Alternative 4. No Cervid Damage Management by WS

This alternative would eliminate WS' involvement in all cervid damage management activities in Wisconsin, as well as eliminate WS assistance to the WDNR or WDATCP in cervid herd health monitoring and management. WS would not provide technical or direct operational assistance, and requesters of WS assistance would have to conduct their own cervid damage management without WS input. This alternative would not allow WS to fulfill its obligations to the WDNR to administer the WDACP and nuisance deer damage assistance to the public.

3.3 CERVID DAMAGE MANAGEMENT STRATEGIES AND METHODOLOGIES AVAILABLE TO WS

The strategies and methodologies described below include those that could be used or recommended under Alternatives 1, 2, or 3 described above. Alternative 4 would terminate WS technical assistance and operational cervid damage management. Appendix B describes more thoroughly the methods that could be used or recommended by WS.

3.3.1 Integrated Wildlife Damage Management (IWDM)

The most effective approach to resolving wildlife damage is to integrate the use of several methods simultaneously or sequentially. The philosophy behind IWDM is to implement the best combination of effective management methods in a cost-effective¹⁷ manner while minimizing the potentially harmful effects on humans, target and non-target species, and the environment. IWDM may incorporate cultural practices (i.e., restricting air travel times, no feeding policy),

¹⁷ The cost of management may sometimes be secondary because of overriding environmental, legal, human health and safety, animal welfare, or other concerns

habitat modification (i.e., exclusion), animal behavior modification (i.e., scaring), removal of individual offending animals, local population reduction, or any combination of these, depending on the circumstances of the specific problem.

3.3.2 Technical Assistance Recommendations

"Technical assistance" as used herein consists of WS personnel providing information, instructional sessions, demonstrations, and advice on available and appropriate cervid damage management methods. Technical assistance is generally provided following an on-site visit or verbal consultation with the requester. WS technical assistance includes: 1) demonstrations on the proper use of management devices (i.e., pyrotechnics, exclusion devices, etc.), 2) discussions on deer habits and biology, 3) information on habitat management and exclusionary devices, and 4) deer behavior modification. In some cases, WS provides supplies or materials to use that are of limited availability for non-WS entities. Generally, several management strategies are described to the requester for short and long-term solutions to damage problems; these strategies are based on the level of risk, need, and the practicality of their application. Technical assistance may require substantial effort by WS personnel in the decision making process, but the actual implementation is the responsibility of the requester.

Under APHIS NEPA Implementing regulations and specific guidance for the WS program, WS technical assistance is categorically excluded from the need to prepare an EA or EIS (7 CFR 372.5(c) 60 Fed. Reg. 6,000-603 (1995)). However, it is discussed here because it is an important component of the proposed adaptive IWDM approach to resolving damage problems.

3.3.3 Direct Operational Damage Management Assistance

Operational damage management is the implementation or supervision of damage management activities by WS personnel. Operational damage management assistance may be initiated when the problem cannot effectively be resolved through technical assistance alone, and when Agreements for Control or other comparable instruments provide for WS operational damage management. The initial investigation defines the nature, history, extent of the problem, species responsible for the damage, and methods that would be available to resolve the problem. Professional skills of WS personnel are often required to effectively resolve problems, if the problem is complex.

3.3.4 Education

Education is an important element of WS' program because wildlife damage management is about finding a "balance" or co-existence between the needs of people and needs of wildlife. This is extremely challenging as nature has no balance, but rather, is in continual flux. In addition to the dissemination of educational materials and recommendations to individuals or organizations sustaining damage, lectures and demonstrations are provided to farmers, homeowners, and other interested groups. WS frequently cooperates with other agencies in education and public information efforts. Additionally, technical papers are presented at professional meetings and conferences so that WS personnel, other wildlife professionals, and

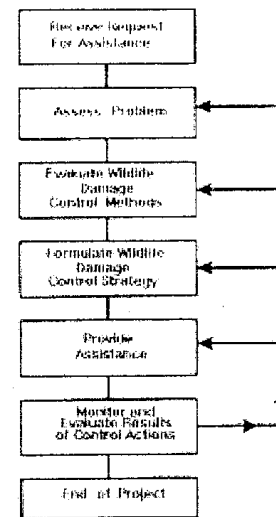
the public are updated on recent developments in damage management technology, laws and regulations, and agency policies.

3.3.5 WS Decision Making

The procedures used by WS personnel to determine management strategies or methods applied to specific damage problems can be found in USDA (1997, Appendix N).

WS personnel use a thought process¹⁸ for evaluating and responding to damage complaints and requests for assistance that are depicted by the WS Decision Model (Slate et al. 1992) (Figure 3-1). WS personnel are frequently contacted after requesters have tried or considered non-lethal methods and found them to be impractical, too costly, or inadequate for reducing damage to an acceptable level. WS personnel assess the problem; evaluate the appropriateness and availability (legal and administrative) of strategies and methods based on biological, economic and social considerations. Following this evaluation, the methods deemed to be practical for the situation are developed into a management strategy. After the management strategy has been implemented, monitoring is conducted and evaluation continues to assess the effectiveness of the strategy. If the strategy is effective, the need for further management may be ended. In some cases, continual conduct of effective wildlife damage management activity is necessary to relieve damage. In terms of the WS Decision Model (Slate et al. 1992), most damage management efforts consist of continuous feedback between receiving the request and monitoring the results of the ongoing damage management strategy.

FIGURE 3-1. WS DECISION MODEL



3.3.6 Community Based Selection of a Cervid Damage Management Program

This process for involving local communities and local stakeholders in the decisions whether to implement cervid damage management assures that local concerns are considered before individual damage management actions are taken.

3.3.6.1 Technical Assistance Provided by WS to Resource Owners for Selection of a Cervid Damage Management Program

The WS program in Wisconsin follows the "Co-managerial approach" as described by Decker and Chase (1997) to solve wildlife damage or conflicts. Within this management model, WS provides technical assistance regarding the biology and ecology of white-tailed deer and effective, practical, and reasonable methods available to reduce deer damage to local requesters. This includes non-lethal and, if appropriate, lethal methods. WS and other state and federal

¹⁸ The WS Decision Model is not a written process but a mental problem-solving process common to most, if not all professions to determine appropriate actions to take.

wildlife or wildlife damage management agencies may facilitate discussions at local community meetings when resources are available. Resource owners/ managers and others directly affected by cervid damage or conflicts in Wisconsin have direct input into the resolution of such problems. They may implement management recommendations provided by WS or others, or may request management assistance from WS, other wildlife management agencies, local animal control agencies, or private businesses or organizations.

Local authorities co-decide with WS which methods could be used to solve a wildlife/human conflict. These co-decision makers include community leaders, private property owners/managers, and public property owners/managers.

3.3.6.2 Community Selection of a Cervid Damage Management Program

The authority that determines whether to implement damage management actions for the local community might be a mayor, city council, common council, park board, or for a homeowner or civic association would be the President or the President's or Board's appointee in consultation and coordination with the WDNR. These individuals are often popularly elected residents of the local community who oversee the interests and business of the local community. These individuals would represent the local community's interest and make decisions for the local community or bring information back to a higher authority or the community for discussion and decision making. Identifying the authority that determines whether to implement damage management actions for local business communities is more complex because the lease may not indicate whether the business must manage wildlife damage themselves, or seek approval to manage wildlife from the property owner or manager, or from a governing board. WS would provide technical assistance and recommendations to the local community or local business community authority(ies) to reduce damage. Operational damage management could be provided by WS if requested by the local community authority, funding was provided, and the requested operational damage management was consistent with WS recommendations, policy, federal and state laws, and coordinated with the WDNR.

3.3.6.3 Private Property Selection of a Cervid Damage Management Program

When one person owns a parcel of property, the authority determining whether to implement a damage management plan would be him or herself in consultation and coordination with the WDNR. WS would provide technical assistance and recommendations to this person to reduce damage. If no homeowner or civic association represents the affected resource owners of the local community, then WS would provide technical assistance to the self or locally appointed authority(ies). Operational damage management would be provided by WS if requested, funding was provided, and the requested operational damage management was consistent with WS recommendations, policy, federal and state laws, and coordinated with the WDNR.

3.3.6.4 Public Property Selection of a Cervid Damage Management Program

The authority determining whether to implement a damage management plan for local, state, or federal property would be the official responsible for or authorized to manage the public land to meet interests, goals and legal mandates for the property. WS would provide technical assistance and recommendations to this person to reduce damage. Operational damage management would be provided by WS if requested, funding was provided, and the requested operational damage management was consistent with WS recommendations, policy, federal and state laws, and coordinated with the WDNR.

3.4 POTENTIAL WILDLIFE DAMAGE MANAGEMENT METHODS

USDA (1997, Appendix J) describes methods currently used by the WS program. Several of these were considered in this EA because of their potential use in reducing cervid damage to agriculture, property, natural resources, and human health and safety. A listing and more detailed description of the methods used by Wisconsin WS for deer damage management is provided in Appendix B of this EA

3.4.1 Non-lethal Methods

Resource management. This method involves managing existing resources to discourage or eliminate the attractiveness of an area to deer or to minimize the likelihood that there will be conflict. Examples of this include changes in human behavior (e.g., restructuring airport peak landing and take off times to avoid periods of high deer presence), habitat modification, and modifying crop cultivation practices (e.g., reducing vegetative cover, forage crops, or plant less palatable plants).

Physical exclusion. Fencing, netting, or other barriers (natural and artificial) can limit cervid access to a particular area/resource. There are several types of fences that can inhibit cervid access including: plastic mesh netting, temporary electric, high tensile electric, woven wire, chain-link, and solid wall fencing.

Behavior modification¹⁹. The proper and integrated use of harassment techniques including auditory scaring techniques (i.e., pyrotechnics, propane exploders, electronic distress sounds, sirens, etc.) and visual scaring techniques (Mylar ribbon, balloons, effigies, flashing lights, etc.) could help reduce conflicts.

Repellents¹⁹. Repellents fall under two categories, contact repellents and area repellents. Contact repellents are those repellents which are applied to vegetation to discourage deer from browsing (i.e., Ropel®, Hinder®). Area repellents are designed to repel deer by odor alone (i.e., predator urine, bone tar, Deer Away-Big Game Repellent®, etc.).

Live-capture - In some areas shooting may not be appropriate due to safety concerns. Capture methods for deer include: darting with capture drugs, clover traps, box traps, drop nets, net guns, and rocket nets. Captured deer would be euthanized and/or relocated under permits issued by

¹⁹ Harassment techniques and repellents often only produce the desired result for a short time until individual wildlife become accustomed to the disturbance (Pfeifer and Goos 1982, Conover 1982).

WDNR. Methods of euthanasia would include those recommended by the AVMA (Beaver et al. 2001) or the recommendations of a veterinarian.

Population Stabilization through Reproductive Inhibition - Cervids could be sterilized or contraceptives administered to limit their ability to produce offspring. However, use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics, habitat and environmental factors, socioeconomic and other factors. In addition, use of this method is subject to approval by federal and state agencies and therefore could not be part of any of the action alternatives analyzed in this EA at this time. If a contraceptive measure is proven effective and registered for use in Wisconsin, WS would consider its use as a method under any operational cervid damage management program implemented by WS.

3.4.2 Lethal Methods

Shooting - Shooting is a very individual specific method and is normally used to selectively remove a single animal. If used, this method would be used to shoot cervids from the ground, in elevated stands or vehicles, or from aircraft (WS Directive 2.620). Shooting may sometimes be one of the only cervid damage management options available if some factors preclude using other strategies to remove deer (i.e., sport hunting or live capture). Aerial gunning would only be used on lands where it is authorized and determined by WS to be an appropriate method. Good visibility is required for effective and safe aerial gunning and relatively clear and stable weather conditions are necessary. Summer conditions limit the effectiveness of aerial gunning as heat reduces cervid activity, and visibility is greatly hampered by vegetative ground cover. High temperatures, which reduce air density, and extreme cold temperatures may affect low-level flight safety and would restrict aerial gunning activities.

The use of firearms is a public safety concern related to the potential misuse. To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as set forth in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. However, WS has no control over the safe use of firearms by agricultural producers or anyone else. All WS aerial gunning activities are required to comply with WS Directive 2.620 and the WS Aviation Policy Manual, and all aircraft, pilots and gunners will be certified by the WS Aviation Manager.

Beuthanasia® D - is regulated by the DEA and the FDA for euthanization of dogs, but legally may be used on other animals if the animal is not intended for human consumption (WS Directive 2.430). The active ingredients in Beuthanasia®-D are sodium phenytoin and sodium pentobarbital and this solution is generally injected intravenously to produce a painless death.

Hunting programs - Regulated sport hunting provides a good avenue to reduce deer damage in localized areas. WS may recommend the use of WDNR regulated firearm and archery deer harvest programs to reduce deer damage in under certain conditions.

3.5 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL WITH RATIONALE

3.5.1 Lethal Only Cervid Damage Management by WS

Under this alternative, WS would only provide lethal operational control services and technical assistance. Requests for information regarding non-lethal management approaches would be referred to WDNR, WDATCP, local animal control agencies, or private businesses or organizations. Individuals might choose to implement WS lethal recommendations, implement non-lethal methods or other methods not recommended by WS, contract for WS lethal operational management assistance, use contractual services of private businesses, or take no action. This alternative would not allow WS to fulfill its obligations with the WDNR or numerous counties throughout the state to administer the WDACP. In addition, this alternative would not allow WS to fulfill its obligations to the WDNR to operate a nuisance wildlife damage management program that provides non-lethal and lethal recommendations to requesters seeking free, technical advice through a toll-free 1-800 helpline. Therefore, this alternative is excluded from further consideration.

3.6 MITIGATION AND STANDARD OPERATING PROCEDURES FOR WILDLIFE DAMAGE MANAGEMENT TECHNIQUES

3.6.1 Mitigation in Standard Operating Procedures (SOP)

Mitigation measures are any features of an action that serve to prevent, reduce, or compensate for impacts that otherwise might result from that action. The current WS program, nationwide and in Wisconsin, uses many such mitigation measures and these are discussed in detail in Chapter 5 of USDA (1997). Some key mitigating measures pertinent to the proposed action and other alternatives that are incorporated into WS' SOP are listed below.

Mitigation Measures	Alternatives			
	Current Program	IWDM	Non-lethal	No Program
<i>Animal Welfare and Humaneess of Methods Used by WS</i>				
Research on selectivity and humaneess of management practices would be adopted as appropriate.	X	X	X	
The WS Decision Model (Slate et al. 1992) would be used to identify effective biological and ecologically sound deer damage management strategies and their impacts.	X	X	X	
Euthanasia procedures approved by the AVMA would be used for live animals.	X	X		
The use of newly developed, proven non-lethal methods would be encouraged when appropriate.	X	X	X	

<i>Safety Concerns Regarding WS Damage Management Methods</i>				
The WS Decision Model (Slate et al. 1992), designed to identify the most appropriate damage management strategies and their impacts, would be used to determine cervid damage management strategies.	X	X	X	
<i>Concerns about Impacts of Damage Management on Target Species, T/E Species, Species of Special Concern, and Non-target Species</i>				
WS consulted with the USFWS and WDNR regarding T/E species and would continue to adhere to/implement all applicable measure to ensure protection of T/E species.	X	X	X	
Management actions would be directed toward localized populations or groups and/or individual offending animals.	X	X	X	
WS personnel are trained and experienced to select the most appropriate methods for removing targeted animals and excluding non-target species.		X		
WS would initiate consultation with the USFWS following any incidental take of T/E species.	X	X	X	
WS take of free-ranging deer would be provided the WDNR to monitor to overall deer populations or trends in population to assure the magnitude of take is maintained below the level that would cause significant adverse impacts to the viability of deer populations (See Chapter 4)	X	X		

CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter provides information for making informed decisions on alternatives for a WS cervid damage management program outlined in Chapter 1, the issues and affected environments discussed in Chapter 2 in relation to the action alternatives analyzed, and potential cumulative impacts. This chapter analyzes the environmental consequences of each alternative. The analysis of environmental effects which could be expected from each alternative takes into account the WS decision making process (Slate et al. 1992) and guidance provided from WS' directives.

4.2 ANALYSIS OF SOCIAL CONSEQUENCES, RESOURCE USE AND SIGNIFICANCE

This section analyzes the environmental consequences using Alternative 1, the no action alternative, as the baseline when comparing the other alternatives to determine if the real or potential adverse affects are greater, lesser or the same (Table 4-2). The No Action alternative is a procedural NEPA requirement (40 CFR 1502.14(d)) and is a viable and reasonable alternative that could be selected. The No Action Alternative, as defined here, is consistent with CEQ (1981).

4.2.1 Social and Recreational Concerns

Social and recreational concerns are discussed throughout the EA, in WDNR 1995, WDNR (2003) and in USDA (1997) to which this EA is tiered. Social and recreational concerns are also analyzed against the alternatives analyzed in detail in Section 4.2 of this EA.

4.2.2 Irreversible and Irretrievable Commitments of Resources

The following resource values within Wisconsin would not be adversely impacted by any of the alternatives analyzed in this EA: soils, geology, minerals, water quality/quantity, flood plains, wetlands, visual resources, air quality, prime and unique farmlands, aquatic resources, timber, and range. These resources will not be analyzed further.

Other than minor uses of fuels for motor vehicles and electrical energy for office maintenance, there are no irreversible or irretrievable commitments of resources. Based on these estimates, the Wisconsin WS program produces very negligible impacts on the supply of fossil fuels and electrical energy.

4.2.3 Cumulative and Unavoidable Impacts

Cumulative and unavoidable impacts of each alternative to free-ranging deer and non-target populations are discussed and analyzed in this chapter (Section 4.2) and affects from this management plan are discussed in relationship to wildlife species/groups. This EA recognizes

that the total annual removal²⁰ of individual free-ranging deer from their population by all causes is the cumulative mortality.

Estimating wildlife densities is not precise and populations and habitat are often dynamic, therefore, professional judgment is required to account for unknowns and variables. Some of the variables include things such as the ability of habitats to support higher animals, habitat variability affects on population stability, predation and recruitment. In addition, wildlife populations can change considerably from one year to the next due to factors such as drought, food shortages or disease. As a result, any population estimate would only be for a given point in time and population levels can change rapidly. The WDNR however has estimated wild deer populations for many years (Table 4-1). Therefore, adverse affects assessments are based on conservative estimates to better insure that no unwanted adverse wildlife population impacts would occur.

Analysis of Wisconsin WS' free-ranging deer "take," combined with other mortality, indicates that cumulative annual impacts would not be significant, and through close coordination and consultation with the WDNR would not be expected to adversely affect free-ranging deer populations. The Wisconsin WS program is not expected to have any adverse cumulative affects on non-target wildlife or their habitats, including T/E species (see Section 1.6.2, 1.6.5, 1.6.6 and 2.2.2). Furthermore, cervid damage management, as implemented by WS, would not jeopardize public health and safety.

4.2.4 Evaluation of Significance

Each major issue is evaluated under each alternative and the direct, indirect and cumulative impacts were analyzed. NEPA regulations describe the elements that determine whether or not an impact is "significant." Significance is dependent upon the context and intensity of the action. The following factors were used to evaluate the significance of impacts in this EA that relate to context and intensity (adapted from USDA 1997) for this proposal:

4.2.4.1 Magnitude of the Impact (size, number, or relative amount of impact) (intensity)

The "Magnitude" analysis for the alternatives analyzed in this EA follows the process described in USDA (1997:Table 4-2). Magnitude is defined in USDA (1997) as "... a measure of the number of animals killed in relation to their abundance." Magnitude may be determined either quantitatively or qualitatively. Qualitative analysis is based on population trends and harvest data or trends and modeling. "Other Harvest" includes the known sport harvest, and other information obtained from the WDNR. "Total Harvest" is the sum of the Wisconsin WS kill combined with the "Other Harvest."

²⁰ It is recognized that the other mortality of wildlife (i.e., road kills, disease, natural mortality, etc.) occurs throughout Wisconsin but no reliable system exists for recording this information.

4.2.4.2 Duration and Frequency of the Impact (temporary, seasonal impact, year round or ongoing) (intensity) (Duration and frequency of an operational program related to assisting state and other federal agencies surveillance and monitoring of the deer herd health and disease/herd management to maintain the health of Wisconsin's free-ranging deer herd, in part, would be determined by the WDNR and the goals and management responsibilities of the WDNR).

4.2.4.3 Likelihood of the Impact (intensity)

4.2.4.4 Geographic Extent (the actions could occur anywhere in Wisconsin where damage management has been requested, agreements for such actions are in place and action is warranted, as determined by implementing the WS Decision Model. Actions would be limited to areas receiving damage by free-ranging deer or captive cervids, or the threat from free-ranging deer or captive cervids. (Context).

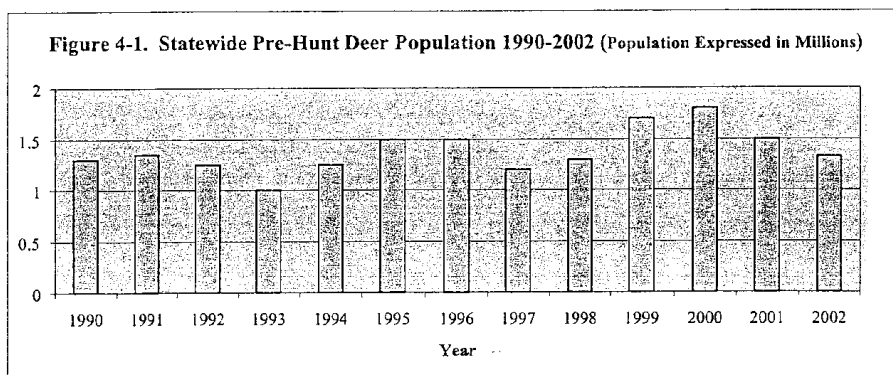
4.3 ISSUES ANALYZED BY ALTERNATIVES

Six key potential issues of this program have been identified, and each of these issues is analyzed for each alternative. The six issues are effects on: free-ranging white-tailed deer populations; plants and other wildlife species, including T/E species; human health and safety; humaneness of methods used; aesthetic values, and regulated white-tailed deer hunting.

4.3.1 Alternative 1. Current Cervid Damage Management Assistance Program (No Action)

4.3.1.1 Effects on white-tailed deer populations

The authority and responsibility for managing resident wildlife species resides with the WDNR. The WDNR manages free-ranging white-tailed deer as a protected game species with many restrictions on their management and harvest (WAC NR §§ 10.10, WAC NR §§ 10.103, WAC NR §§ 10.104). The WDNR collects and compiles information on white-tailed deer population trends, sport harvest, and other known mortality, and uses this information to manage for sustainability and healthy deer populations. Free-ranging white-tailed populations have remained healthy and viable in Wisconsin (Figure 4-1) and populations monitoring continues to insure harvestable and viable populations. The WDNR uses a number of strategies to manage for a healthy deer herd (WDNR 2003) and this information has been considered in the analysis of potential impacts of WS' activities on Wisconsin's free-ranging deer herd.



The population of free-ranging deer in Wisconsin is continually fluctuating. It was conservatively estimated that there were 1,200,000 to 1,800,000 huntable deer in Wisconsin from 1997 to 2002 (Table 4-1). These estimates are derived from the WDNR utilizing pre-harvest data and population

modeling. The potential cumulative adverse affects from WS' current program relate to reducing damage/threats to human health and safety, crops, property and natural resources caused by free-ranging deer and the long-term health of deer populations in

Table 4-1. Estimate Deer Population, Sport Harvest and WS Deer Take*

Year	Estimated** Deer Population	Sport Harvest	Sport Harvest	WS Intentional Take	WS Harvest of Population	WS Percent of Sport Harvest
1997	1,200,000	359,628	30%	43	0.0036%	0.01%
1998	1,300,000	407,555	31.4%	0	0.0%	0.0%
1999	1,700,000	494,116	29.1%	20	0.0012%	0.0041%
2000	1,800,000	615,393	34.2%	2	0.0001%	0.0003%
2001	1,500,000	444,384	29.6%	28	0.0016%	0.0063%
2002	1,330,000	371,575	27.9%	130***	0.0098%	0.035%

* No non-target animals were removed or killed by WS during cervid damage management activities.

** Population estimate based on WDNR pre-harvest data and population modeling.

*** Some deer were taken at the request of the WDNR for CWD surveillance.

Wisconsin. Because white-tailed deer populations are sufficiently high throughout the State (Figure 4-1), the statewide population would not be substantially diminished by local WS damage management activities, sport harvest, or localized depopulation efforts for monitoring and disease concerns (Table 4-1) (WDNR 2003). The removal of diseased free-ranging deer would ultimately make for a healthier population that would readily re-establish itself in locations where habitat exists. Successful suppression of deer damage and disease transmission would benefit deer populations long-term and would protect the interests of concerned groups (hunters, wildlife watchers, wildlife managers, and captive cervid owners) (WDNR 2003). The selective nature of the methods proposed for use by WS for damage management and by the WDNR in disease management zones would eliminate non-target take while restricting disease movement and minimize spread; WS did not kill any non-target species during cervid damage management. Health concerns related to disease transmission should decrease commensurate with the elimination of diseased cervids. A primary cumulative concern is the ongoing nature of disease suppression, which could take a long time with extensive depopulation and disposal efforts (WDNR 2003).

WS would provide technical assistance and limited operational cervid damage management under this alternative with few deer removed by WS (Table 4-1); therefore, WS would have no adverse affect on free-ranging deer populations and WS' magnitude of impact would be low. Local deer populations could decline, stay the same, or increase depending on habitat and weather conditions, or actions taken by the WDNR or others. Some resource owners may remove deer, or allow sport hunters access to harvest deer during the regulated hunting season. This alternative would limit WS involvement to primarily technical advice and limited disease monitoring assistance to the WDNR. Although WS could assist Wisconsin State agencies in the surveillance and removal of deer, the efforts would be conducted primarily by the WDNR. In addition, resource owners may obtain special permits from the WDNR to allow them to remove deer outside of the regulated hunting season and in areas where sport hunting is not allowed.

Deer populations could increase where hunting pressure was low, could stabilize where hunting and permitted removal activities were in balance, or when an insufficient number of deer are removed, deer numbers could increase or decline if habitat, disease or other threats adversely affect deer populations. Some resource owners may take illegal, unsafe, or environmentally harmful action against local populations of deer out of frustration or ignorance, but would likely occur at a lower rate than Alternatives 3 or 4 if WS advice is provided and implemented.

4.3.1.2 Effects on plants and other wildlife species, including T/E species

To date, WS has not killed any non-target animals while conducting cervid damage management activities in Wisconsin and this pattern is expected to continue. In the absence of a WS integrated cervid damage management program with the ability to address all problems, some resource owners with little or no experience may attempt to remove deer when WS can not provide assistance. These resource owners would be more likely than WS personnel to take a non-target species and not report non-target take. Additionally, damage caused by deer to plant and wildlife species, including T/E species, may increase in situations where resource owners do not seek and implement WS technical assistance advise or WS implements a cervid damage management program, however, the impacts of this alternative would be similar to Alternative 2, 3 or 4.

Nationally, WS has consulted with the USFWS regarding potential adverse impacts of damage management methods on T/E species, and abides by reasonable and prudent alternatives (RPA) and/or reasonable and prudent measures (RPM) established as a result of that consultation (USDI 1992). Further consultation on species not covered by or included in that consultation has been initiated with the USFWS, and WS will abide by any RPA, RPM, and terms and conditions that result from that process to minimize adverse affects to listed species.

4.3.1.3 Effects on human health and safety

Under the current program, limited operational damage management occurs. To ensure safe use and awareness of firearms, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as set forth in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. However, WS has no control over the safe use of firearms by producers or anyone else.

If deer populations increase, the potential exists for increased threats to public health and safety, particularly from deer/vehicle or aircraft collisions, or disease transmission. However, the current program provides technical assistance and limited operational cervid damage management to those experiencing cervid damage. In addition, resource owners experiencing damage may seek special permits from the WDNR to attempt to solve deer damage problems through trapping and shooting. The activities of resource owners could increase risks to human health and safety from improper or inexperienced use of damage management methods. This

increased risk would likely be less than Alternatives 3 or 4 when WS recommendations are obtained and implemented.

4.3.1.4 Humaneness of methods to be used

WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Therefore, many people would consider this alternative humane because WS would implement primarily non-lethal cervid damage management methods and minimal deer removal measures. Resource/property owners could use lethal and non-lethal methods recommended by WS to reduce deer damage or implement their own control methods without WS assistance. Some resource/property owners may take illegal action against localized populations of deer out of frustration if non-lethal methods are ineffective in reducing damage to acceptable levels. Some of these illegal actions may be less humane than methods used by experienced WS personnel. The humaneness of actions implemented by non-WS would be variable dependent upon the person implementing the action.

4.3.1.5 Effects on aesthetic values

The impacts of this alternative to stakeholders would be variable depending on their values towards wildlife, compassion for their neighbors, or tolerance for cervid damage. Resource owners receiving damage from deer could oppose this alternative if non-lethal methods are ineffective or inappropriate for the situation because they would bear the damage or potential threats caused by deer. While WS would take limited operational action under this alternative, other individuals or entities could, and likely would, conduct deer damage management activities. If persons wished to observe, photograph or hunt deer they may have to go to other areas outside of damage management areas if cervid damage management methods (i.e., dispersal, exclusion, removal, etc.) are effective. However, the areas where WS would conduct such activities are generally small in relation to Wisconsin (e.g., during FY 99, 00, 01, and 02 WS conducted operational cervid damage management activities on only eight farms encompassing 2058 acres, or less than about 0.006% of the state and on some additional acreage at the request of the WDNR for CWD surveillance and monitoring purposes) and available deer habitat, and they would simply need to visit other nearby areas.

4.3.1.6 Effects on regulated white-tailed deer hunting

WS would have very minimal adverse affect on regulated sport deer hunting (see Section 4.3.1.1). If WS cervid damage management methods are effective, persons wishing to interact with deer may have to seek other nearby areas. However, WS only conducts damage management after receiving a request for assistance from resource owners and the areas where WS would conduct damage management are generally very small in relation to Wisconsin and available deer habitat (e.g., during FY 99, 00, 01, and 02 WS conducted operational cervid damage management activities on only eight farms encompassing 2058 acres, or less than about 0.006% of the state and on some additional acreage at the request of the WDNR for CWD surveillance and monitoring purposes). In addition, resource owners may remove deer under special permits issued by WDNR resulting in similar impacts to all the alternatives analyzed in this EA.

4.3.2 Alternative 2. Adaptive Integrated Cervid Damage Management Program (Proposed Action)

4.3.2.1 Effects on white-tailed deer populations

WS actions, under Alternative 2, would primarily be to reduce cervid damage to crops, property and to protect public health and safety. It is expected that WS would remove less than 200 deer annually for the protection of human health and safety, agricultural and property, and natural resources under permits issued by the WDNR. A WS take of up to 200 free-ranging deer is <0.02% of the estimated statewide population based on the low estimate of the past 6 years of population estimates (Table 4-1) and is <0.044% of an estimated hunter harvest (about 450,000 deer annually based on last 6 years figures). Additional, if WS would receive several requests to protect resources or public health and safety (damage management on airports or industrial sites) and WS determine that deer removal was appropriate, and removed up to 1,000 deer, WS take would be about 0.83% of the low estimate population and 0.22% of the hunter harvest. Using the estimated statewide population, or harvest data, the annual take of up to 1,000 deer by WS would have an extremely low magnitude of impact (Table 4-1).

WS may also be requested to assist the WDNR to monitor and conduct surveillance to reduce the spread and risks of CWD. If the WDNR requested WS assistance to monitor CWD, all WS activities would be coordinated with the WDNR and under permits issued by the WDNR. WS assistance to the WDNR to monitor Wisconsin deer herd health and conduct disease surveillance could result in additional deer being removed under the authority of the WDNR and permits issued by the WDNR. Effects on the statewide free-ranging white-tailed deer population as a result of assistance provided by WS under such a request would be minimal and analyzed in WDNR (2003), and contribute to the assurances of the WDNR for a healthy free-ranging deer herd in Wisconsin. Thus, WS or other cumulative take appears to be far beneath the level that would adversely affect or begin to cause a decline in Wisconsin's free-ranging deer population (WDNR 2003). WDNR biologists have concurred with WS' analysis that WS cervid damage management will have no adverse affect on the statewide deer population and be of a low magnitude of impact.

4.3.2.2 Effects on plants and other wildlife species, including T/E species

WS personnel are trained and experienced to select the most appropriate tools and methods for taking target animals and excluding non-target animals. WS' take of non-target animals is expected to be nonexistent or extremely minimal under this alternative. Neither other wildlife populations nor the ecosystem would be negatively affected (WDNR 2003), except for the occasional dispersing effect from the sound of vehicles, personnel or gunshots. In these cases, birds and other mammals may temporarily leave the immediate vicinity, but would most likely return after personnel leave the area.

The USFWS office has provided a list of federal T/E species by county in Wisconsin. WS has determined that the proposed action will not likely adversely affect and/or will have no effect on any federal T/E species and the USFWS has concurred with this conclusion (J. Smith, USFWS

letter to D. Nelson, WS, May 22, 2003, L. Lewis, USFWS letter to G. Larson, WS, May 9, 2001)). WS also conferred with the WDNR, Bureau of Endangered Resources, which determined that the proposed WS action would have no effect or not likely to adversely affect any state listed T/E species or their habitats and ecosystems (S. Holtz, WDNR letter to D. Nelson, WS, May 12, 2003). In contrast, WS could positively benefit State and federally listed T/E species by reducing deer browsing damage to listed plant species and to habitat that is being used by T/E species (WDNR 2003).

This alternative should provide for the best opportunity to protect agricultural crops or other resources from damage caused by deer.

4.3.2.3 Effects on human health and safety

WS' proposed methods pose no to minimal threat to human health and safety. It is the policy of WS that safety of WS employees and the public is of primary importance when WS personnel implement damage management methods to conduct official duties. WS follows firearm safety precautions when conducting damage management activities and complies with pertinent laws and regulations governing the lawful use of firearms. WS cervid management activities using firearms will be conducted in accordance with WS firearms use policies, Wisconsin WS firearms use and shooting policies and procedures, and WDNR permitting requirements. In addition, to ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years thereafter (WS Directive 2.615). Further, WS employees, who carry firearms as a condition of employment, are required to verify that they meet the criteria as set forth in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. However, WS has no control over the safe use of firearms by producers or anyone else.

Shooting with shotguns or rifles from the ground, in elevated stands, or from vehicles (e.g., ground vehicles or aircraft) would be used to reduce cervid damage or monitor herd health when lethal methods are determined appropriate. WS' live traps would be strategically placed to increase efficacy while minimizing exposure to the public and pets, and appropriate signs would be posted on all properties where live traps are set to alert the public of their presence. WS could use firearms or euthanizing agents to euthanize cervids captured in live traps, as appropriate.

This alternative would have no to very minimal adverse affect on human health and safety. However, this alternative could increase public health and safety at sites where cervid damage management is conducted by alleviating potential threats to deer/aircraft and deer/vehicle collisions, and diseases transmission (WDNR 2003).

4.3.2.4 Humaneness of methods to be used

WS personnel are experienced and professional in their use of management methods, and methods are used as humanely as possible. Under this alternative, cervids would be shot or trapped as humanely as possible by experienced WS personnel using the best methods available.

Cervids captured in live traps could be relocated²¹ or euthanized, as authorized by the WDNR. Some individuals may perceive this alternative as inhumane because they oppose all lethal methods of damage management. However, this alternative allows WS to consider non-lethal methods, and WS would implement non-lethal methods for cervid damage management if they would be deemed effective and as coordinated with the WDNR and WDATCP, as appropriate.

4.3.2.5 Effects on aesthetic values

The adverse affects of this alternative to stakeholders would be variable depending on their values towards wildlife and compassion for their neighbors. Most resource owners who are receiving damage would likely favor this alternative because it allows for an IWDM approach to reduce damage problems. An IWDM approach allows for the use of the most appropriate damage management methods while minimizing harm to people, non-target animals and the environment. Some individuals would oppose this alternative, and most action alternatives, because they believe it is morally wrong to kill or use animals for any reason, or they believe that the benefits derived from having cervids in their environment outweigh the associated damage.

The ability to view and aesthetically enjoy cervids, primarily free-ranging deer, at a particular site or WDNR CWD Management Zone could be reduced if the deer are removed or if diseases reduce deer populations (WDNR 2003). New deer, however, would reoccupy and use the site in the future, although the length of time until new animals arrive is variable, depending on the habitat, time of year, type of diseases and population densities in the area (WDNR 2003). However, the opportunity to view deer would still be available if a person makes the effort to visit sites with adequate habitat outside of deer damage or WDNR disease management zones/areas.

Public reaction to this alternative would be variable and mixed because there are numerous philosophical, aesthetic, and personal attitudes, values, and opinions about the best ways to reduce conflicts/problems between humans and wildlife and the best way to manage for healthy deer herds. The WS IWDM approach, which includes use of non-lethal and lethal method on a case-by-case basis, provides the greatest array of management strategies and relief from deer damage and disease threats to human health or safety. Many people directly affected by damage or deer borne diseases problems, and threats to human health or safety caused by free-ranging deer insist upon their removal from the property or public location when the wildlife acceptance capacity is reached or exceeded. Some people will have the opinion that deer should be captured and relocated to another area to alleviate damage or threats to human health or safety; this could be conducted, however, after consultation and coordination with the WDNR, if appropriate. Some people would strongly oppose removal of the deer regardless of the amount of damage. Individuals not directly affected by the threats or damage may be supportive, neutral, or totally opposed to any removal of deer from specific locations or sites. Some people that totally oppose lethal damage management want WS to teach tolerance for deer damage and threats to public health or safety, and that deer should never be killed.

²¹ Population reduction achieved through capture and relocation is labor intensive and would be costly (i.e., \$273-\$2,876/deer). Additionally, relocation frequently results in high mortality rates for deer (i.e., from 25-89% within the first year after relocation). Although relocated deer usually do not return to their location of capture, some do settle in familiar habitats and continue to create problems.

4.3.2.6 Effects on regulated white-tailed deer hunting

The WDNR manages deer to provide every opportunity for people to view deer and for sport hunters to participate in regulated hunting seasons which generally result in large harvests of the deer herd (Table 4-1). Hunting provides one of the most effective strategies for reducing population densities for damage management and CWD management and surveillance (WDNR 2003). Shooting of free-ranging deer by WS personnel would only be conducted after consultation and coordination with the WDNR and only after a permit has been issued by the WDNR. Deer removals would be conducted after it is determined that deer are causing damage to protected resources, in situations where deer are causing a potential human health and safety threat, or deer are causing a threat of spreading diseases.

This activity could result in reduced deer densities on some project areas or WDNR CWD Management Zones and result in lower densities in some deer management zones (WDNR 2003). The impact of most WS crop and property protection and human health and safety activities would not result in reduced deer hunting and viewing opportunities. This is due to:

- the number of deer expected to be removed by WS is minimal when compared to the number harvested by sport hunters in Wisconsin (Table 4-1) (WDNR 2003) and
- the number of deer expected to be killed by WS would not cause a statewide reduction in deer populations (Table 4-1 and Section 4.3.2.1) (WDNR 2003).

There may be some cases, where landowners have not permitted regulated deer hunting, but would allow WS personnel to remove deer for damage resolution, disease monitoring or herd health management purposes. This would have a minimal adverse affect on deer hunting, since the land was not previously accessible to hunters and monitoring efforts may identify herd health problems earlier and reduce the severity of the problem. Impacts to regulated deer hunting under this proposed alternative are expected to be similar to those which would occur under Alternatives 1, 3 or 4 because the WDNR has management responsibility for wildlife in Wisconsin and to protect and enhance the state's natural resources (e.g., air, land and water; wildlife, fish and forests and the ecosystems that sustain all life²²).

4.3.3 Alternative 3. Non-lethal Only Cervid Damage Management by WS

4.3.3.1 Effects on white-tailed deer populations

WS would not kill any cervids under this alternative but only provide non-lethal assistance to requesters. Local free-ranging deer populations could decline, stay the same, or increase depending on actions taken by the WDNR or others, or risks posed by diseased cervids. Some resource owners may remove cervids, or allow hunters access to harvest cervids. Landowners may obtain special permits from the WDNR to remove deer outside of the regulated hunting season and in areas where sport hunting is not allowed. Deer populations could increase where

²² Primary control of deer disease prevention resides with the WDNR calling into question the value of any federal process in planning and decision making for this aspect of the program. Still, an educated and involved citizenry can help inform planners and decision makers at all levels of government. In the circumstances, the best way in which to involve and educate citizens consistent with the State's timeframe of need is through the public NEPA process.

hunting pressure was low, could stabilize where hunting and permitted removal activities were in balance, or when an insufficient number of deer are removed, deer numbers could increase or decrease if habitat, disease or other threats adversely affect deer populations. Some resource owners may take illegal, unsafe, or environmentally harmful actions against local populations of deer out of frustration or ignorance if damage or threats occur. While WS could only provide non-lethal assistance under this alternative, others could conduct lethal damage management resulting in impacts similar to the proposed alternative, as well as Alternatives 1, 2 or 4.

4.3.3.2 Effects on plants and other wildlife species, including T/E species

When resource owners do not implement their own lethal control methods, damage caused by deer to plants and wildlife species, including T/E species, may increase where the use of non-lethal methods does not reduce damage to acceptable levels. In these situations impacts would be similar to Alternative 4.

In the absence of an integrated cervid damage management program by WS that includes the option for removal of deer from damage sites, some resource owners with little or no shooting experience may attempt to remove deer. These resource owners would be more likely than WS personnel to take non-target species and not report non-target take. WS take of non-target species has been and would be expected to be nonexistent or extremely minimal. The effects of WS use of non-lethal methods would be similar to those described under the proposed action (Alternative 2) and the current program (Alternative 1).

4.3.3.3 Effects on human health and safety

Concerns regarding WS use of lethal methods would be nonexistent under this alternative. However, non-WS personnel would likely use lethal methods not available to WS under this alternative resulting in impacts similar to Alternative 4.

Non-lethal methods would not be sufficient to resolve many deer damage problems or threats by effectively removing or dispersing the deer from the damage site. There is potential for increased threats to public health and safety when non-lethal methods are ineffective and non-WS personnel can not effectively reduce the threats. Resource owners may attempt to lethally resolve deer damage problems through illegal use of chemicals/trapping, pesticides, and shooting. In these situations there may be increased risks to human health and safety from improper or inexperienced use of these methods. Overall, in those situations where non-lethal methods are ineffective, impacts would be similar to Alternative 4.

4.3.3.4 Humaneness of methods to be used

WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Some individuals may perceive this approach as humane because they oppose all lethal methods of damage management. However, without effective damage management methods available, resource owners may take illegal action against some local populations of deer out of frustration of continued damage. In addition, if disease or over-population occurs in localized areas, deer may suffer from a disease outbreak,

starvation, malnutrition, stress, or degradation of habitat, particularly during winter. Some illegal actions implemented by frustrated landowners may be less humane than methods used by WS personnel. While WS could only provide non-lethal assistance under this alternative, other individuals or entities could conduct lethal control with unknown humaneness implication but probably impacts similar to Alternative 4.

4.3.3.5 Effects on aesthetic values

The impacts of this alternative to stakeholders would be variable depending on the damage management efforts employed by resource owners, their values toward deer, the results of management efforts and compassion for their neighbors. Resource owners receiving deer damage would likely oppose this management alternative over Alternative 1 or 2 when non-lethal methods are ineffective. Some people would support this alternative because they believe resource owners would do little to remove deer. Others would oppose this alternative because they believe resource owners would use illegal, inhumane, or environmentally unsafe methods. While WS could only provide non-lethal assistance under this alternative, other individuals or entities could conduct lethal damage management.

4.3.3.6 Effects on regulated white-tailed deer hunting

WS would have minimal adverse affects on regulated deer hunting since WS would not lethally remove deer under this alternative. However, resource owners may remove deer under special permits issued by the WDNR resulting in impacts similar to the proposed action, as well as Alternatives 1, 2 and 4, or resource owners may choose to illegally remove deer causing unknown impacts to regulated hunting.

4.3.4 Alternative 4. No Cervid Damage Management by WS

4.3.4.1 Effects on white-tailed deer populations

WS would not conduct any deer damage management under this alternative and therefore have no affect on free-ranging deer or captive herd populations. Local deer populations could decline, stay the same, or increase depending on actions taken by the WDNR, others, or the effects of disease and habitat degradation. WS would be unable to assist state or federal agencies in monitoring, managing and maintaining deer populations in response to disease outbreaks. The potential adverse environmental consequences of taking no federal action are much greater than those from the proposed program. The effectiveness of this alternative at reducing damage or eliminating CWD²³ in captive and free-ranging deer would, therefore, depend primarily upon the ability of Wisconsin State agencies, cervid farmers, hunters, and wildlife management associations (WDNR 2003). Some resource owners may remove deer, or allow sport hunters access to harvest deer during the regulated hunting season. Resource owners may also obtain special permits from the WDNR to allow them to remove deer outside of the hunting season and in areas where sport hunting is not allowed. Deer populations could continue to increase where mortality factors were low or when an insufficient number of deer are removed under special

²³ CWD behaves, in general, in a manner similar to other late-onset infectious diseases, it is reasonable to expect that management techniques used for chronic late-onset infectious diseases might be appropriate, in the absence of direct information.

permits issued by WDNR. Some resource owners may take illegal, unsafe, or environmentally harmful action against local populations of deer out of frustration or ignorance. While WS would provide no assistance under this alternative, other individuals or entities could provide advice or conduct lethal damage management resulting in unknown impacts in relation to the proposed action alternative. Based upon the lack of success (spread and increased prevalence of CWD) to achieve favorable results with the more conservative approach taken in the Colorado and Wyoming CWD endemic areas, the likely outcome in Wisconsin would be comparable to these other states in the absence of early and aggressive response (WDNR 2003). Federal assistance through WS would be an important asset in this response.

4.3.4.2 Effects on plants and other wildlife species, including T/E species

In the absence of a WS cervid damage management program some resource owners with little or no experience may attempt to remove deer. These resource owners would be more likely than WS personnel to kill a non-target species and not report non-target take. In addition, damage caused by deer to plant and wildlife species, including T/E species, may increase in those situations where the resource owner does not implement their own cervid control program (WDNR 2003).

4.3.4.3 Effects on human health and safety

If deer populations increase where no damage management program is in place, there is potential for increased agricultural damage, threats to public health and safety from deer/vehicle or aircraft collision, or disease threats. Resource owners may attempt to solve deer damage problems through trapping and shooting. Therefore, there could be increased risks to human health and safety from improper or inexperienced use of damage management methods.

4.3.4.4 Humaneness of methods to be used

Many people would consider this alternative humane because WS would not be involved in cervid damage management actions. However, WS personnel are experienced and professional in their use of management methods, and methods are applied as humanely as possible. Under this alternative, resource/property owners could use lethal and non-lethal methods to reduce deer damage and some resource/property owners may take illegal action against localized populations of deer out of frustration of continued damage, or elect to do nothing. However, illegal actions used by landowners would probably be less humane than methods used by experienced WS personnel. The humaneness of actions implemented by non-WS would be variable dependent upon the person implementing the action.

4.3.4.5 Effects on aesthetic values

The impacts of this alternative to stakeholders would be variable depending on landowner values towards wildlife and compassion for their neighbors. While WS would take no action under this Alternative, other individuals or entities could, and would likely conduct cervid damage management. The lower population numbers or less healthy populations of deer could have negative aesthetic consequences for wildlife viewers, recreational naturalists, hunters, and

wildlife managers. The people who routinely visit Wisconsin's natural areas where deer numbers are low could elect to travel to other locations where such conditions are nonexistent or less prevalent.

Resource owners receiving damage from deer would likely strongly oppose this alternative because they would bear the damage caused by deer and any resultant control efforts. Some individuals would prefer this alternative because animal rights activists believe it is morally wrong to kill or use animals for any reason. The impacts on aesthetic values would depend on the actions implemented by others outside of the control of WS or without the recommendations from WS.

4.3.4.6 Effects on regulated white-tailed deer hunting

WS would have no direct effect on regulated sport deer hunting because WS would not implement any cervid damage management programs. However, the lower numbers and less healthy populations of deer could have negative consequences for hunters, and wildlife managers. The hunters who routinely visit Wisconsin's natural areas could elect to travel to other locations where such conditions are nonexistent or less prevalent. However, resource owners may disperse, exclude, or remove deer under special permits issued by WDNR resulting in impacts similar to the proposed action, as well as Alternatives 1, 2 and 3.

4.4 SUMMARY OF IMPACTS

No significant cumulative environmental impacts are expected from any of the alternatives analyzed in this EA. Under the Proposed Action, the lethal removal of deer for crop, property, natural resources, and human health and safety would not have a significant impact on overall deer populations in Wisconsin. However, some local reductions may occur if the WDNR requests WS assistance for CWD monitoring and herd health management (WDNR 2003). Assistance provided to the WDATCP in reducing disease threats in captive cervid herds would not have a significant impact on the statewide number of captive cervids/herds. These removal/depopulation actions would, however be conducted after consultation with and in coordination with the WDNR and/or WDATCP; and therefore would be supported by the both agencies. The potential cumulative impacts from the proposed program are primarily related to the long-term health and size of deer populations in Wisconsin. Successful suppression of CWD disease or other disease risks would be beneficial to uninfected deer and would be protective of the interests of other concerned groups (hunters, wildlife watchers, wildlife managers, and captive cervid farms). No risk to public safety is expected when WS' services are provided and followed by requesting individuals under Alternatives 1, 2, or 3, since only trained and experienced WS professionals would conduct and recommend cervid damage management activities. There could be increased risk to public safety when a person rejects WS assistance and recommendations under Alternatives 1, 2, and 3. The proper disposal of carcasses should not result in any long-term cumulative impacts (WDNR 2003). The primary cumulative concern is the ongoing nature of disease suppression, which could take a long time with localized depopulation and disposal efforts. The selective nature of the intensive management zone should help to restrict disease movement and minimize the spread of CWD, thereby diminishing impacts as the reservoir for CWD. Wildlife and human health concerns related to CWD should decrease

commensurate with the elimination of diseased cervids. Although some persons will likely be opposed to WS' proposed cervid damage management program, the analysis indicates that WS IWDM program will not result in any significant, cumulative, or adverse impacts on the quality of the human environment.

Table 4.2 Comparisons of Issues/Impacts and Alternatives

<i>Issues/Impacts</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>
Effects on white-tailed deer populations	WS would have no or minimal affect on local populations. If resource owners conduct cervid damage management, effects would be more or less than Alternative 2.	Local populations could be reduced and sustained for the short-term. However, no effect on statewide deer populations.	WS would not affect populations locally or statewide. If resource owners conduct cervid damage management, effects would be more or less than Alternative 1 or 2.	WS would not conduct a program and therefore not affect populations. If resource owners conduct cervid damage management, effect could be more or less than Alternative 1, 2 or 3.
Effects on plants and other wildlife species, including T/E species	No adverse affects by WS. Positive effects to those species that are being negatively impacted by deer if WS or resource owners implement damage reduction program.	No adverse affects by WS. Positive effects to those species that are being negatively impacted by deer.	No adverse affects by WS. Positive effects to those species that are being negatively impacted by deer if non-lethal methods are effective.	No impact by WS. Positive affects to those species that are being negatively impacted by deer if resource owner successfully implement damage reduction program.
Effects on Human Health and Safety.	No adverse impact by WS. Slight positive effect from reduced deer strikes and disease transmission.	No probable direct negative effect. Positive effect from reduced deer strikes and disease transmission.	No probable direct negative effect. If resource owners conduct cervid damage management, effect would be variable.	No effect from WS. If resource owners conduct cervid damage management, effect would be variable.
Humaneness of methods to be used.	While most would view as humane, some would view as inhumane. If resource owners conduct deer damage management, humaneness would be variable.	Some would view as inhumane. Others would view as more humane than deer injured or killed by an aircraft, vehicle collision, or a prolonged disease.	Some would view as humane. However, if resource owners conduct lethal deer management activities, humaneness would be variable.	Some would view as humane. However, if resource owners conduct cervid damage management, humaneness would be variable.
Effects on Aesthetic Values.	Populations could slightly decrease, remain the same, or increase. Some increased and some decreased opportunity to view deer. If resource owners successfully conduct cervid damage management, effects could be similar to Alternative 2.	Populations could be reduced locally, less opportunity to view, photograph or hunt deer on the short-term. Damage and disease threats would be reduced under this alternative than from alternatives 1, 3, or 4.	WS would not affect populations. Possible reduction in damage if WS non-lethal actions were effective. If resource owners successfully conduct cervid damage management, effect would be similar to Alternative 1 or 2.	Population would remain the same, decrease or increase depending on the situation. If resource owners successfully conduct cervid damage management, effects could be similar to Alternative 1, 2, or 3.

Effects on Regulated White-tailed Deer Hunting.	Minimal effect by WS. Slight reduction in the number of deer that may be available to hunters during hunting seasons if resource owner or WDNR implements some methods. Effects similar to Alternatives 2, 3 and 4	Potentially, slight reductions in the number of deer that may be available to hunters during hunting seasons in localized areas were WS cervid damage management occurred. Effects similar to Alternatives 1, 3, and 4.	No effect by WS. Slight reduction in the number of deer that may be available to hunters during hunting seasons if resource owner or WDNR implements some methods. Effects similar to Alternatives 1, 2, and 4	No effect by WS. Slight reduction in the number of deer that may be available to hunters during hunting seasons if resource owner or WDNR implements lethal control methods. Effects similar to Alternatives 1, 2, and 3.
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APPENDIX A - LITERATURE CITED

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APPENDIX B

CERVID DAMAGE MANAGEMENT METHODS AVAILABLE FOR USE OR RECOMMENDED BY THE WISCONSIN WILDLIFE SERVICES PROGRAM

*NONLETHAL METHODS*²⁴

Several non-lethal methods may effectively reduce deer, as a variety of fence designs exclude deer damage and their effectiveness generally improves with cost and durability (Craven and Hyngstrom 1994). However, the most effective fences are often too expensive and labor-intensive to be practical. In addition, deer often habituate quickly to novel "frightening" sounds, sights, or smells (Bomford and O'Brein 1990, Craven and Hyngstrom 1994, Curtis et al. 1995). As a result traditional frightening devices (e.g., cracker shells, gunfire, propane cannons, and scarecrows) have generally been ineffective for even short-term periods (Koehler et al. 1990, Belant et al. 1996, Gilsdorf, 2002). A motion-activated acoustic deterrent also has been shown to be ineffective for deer (Belant et al. 1998). Traditional frightening devices, like propane cannons and effigies, are generally ineffective because deer habituate to them relatively quickly (Koehler et al. 1990, Belant et al. 1996).

Resource Management

Resource management consists primarily of non-lethal preventive methods such as cultural methods and localized habitat modification. Resource owners/managers typically implement cultural methods and other management techniques. Resource owners/managers may be encouraged to use these methods, based on the level of risk, need, and professional judgment on their effectiveness and practicality. These methods include:

Changes in human behavior. These may include increasing a person's tolerance for deer damage through education or other changes in human behavior such as altering the times of aircraft departures and arrivals so that air travel occurs when there is low wildlife activity. In addition, aircraft operations could be restricted during specific times of the day or could be restricted to specific runways.

Habitat modification. Localized environmental/habitat modification can be an integral part of wildlife damage management. Wildlife production and/or presence are directly related to the type, quality and quantity of suitable habitat. Therefore, habitat can be managed to reduce or eliminate the production or attraction of certain wildlife species. The resource/property owner is responsible for implementing habitat modifications, and WS only provides advice on the type of modifications that would likely achieve the desired effect. Habitat management is most often a primary component of wildlife damage management strategies at or near airports to reduce problems by eliminating loafing, bedding and feeding sites. Generally, many problems on

²⁴ WS non-lethal methods would be giving first consideration in each damage management situation, however, non-lethal methods may not be used if the situation does not warrant. Non-lethal methods often only produce the desired result for a short time until individual wildlife become accustomed to the disturbance (Pfeifer and Goos 1982, Conover 1982).

airport properties can be minimized through management of vegetation and water on areas adjacent to aircraft runways.

One method, to reduce deer habitat, is using cattle to consume the biomass that deer and other wildlife would feed upon. Continuous heavy grazing by cattle or by mixed classes of livestock eliminating preferred deer foods can reduce deer habitat (Merrill et al. 1957, Merrill 1959, Reardon et al. 1978). Crawford (1984) noted that livestock grazing affects the vigor and composition of plants and the direction and rapidity of plant succession. Thus, livestock grazing can influence the carrying capacity of white-tailed deer habitat (Crawford 1984).

Cultural practices. Studies in agriculture areas of Missouri indicate cultivated crops comprised 41% of deer diet by volume (Korschgen 1962). Thus, by reducing the cultivated crops adjacent to airport runways, deer densities next to these areas may decrease. For example, brome grass for hay could replace row crops, as brome is not a highly preferred food of deer relative to other row crops, alfalfa or clover. While brome grass hay would still provide the airport with a source of revenue. In addition, in some locations agricultural producers may cultivate varieties of crops which are less attractive to deer as a source of forage.

Physical Exclusion

A fence can limit the entry of deer onto affected properties. There are several types of fences that inhibit the movement of deer if properly installed, including plastic mesh fencing, electric fencing, woven wire, and chain link fencing. The height of a fence required to exclude deer is a much debated topic. Smith and Coggin (1984) reported that a 7-foot fence reduced deer-vehicle collisions from 44.3% to 83.9% along a New York thruway. However, deer have been observed to jump a 10-foot, chain-link fence topped with two feet of serpentine wire (M. Jensen, OR-WS, pers. comm. 2002). Clearly and Dolbeer (1999) recommend that airports install a 10-foot chain link fence with barbed-wire outriggers to limit deer entry. For the purpose of this EA, WS recommends a minimum fence height of 8 feet for agricultural applications and 10 feet with three strands of barbed-wire outriggers at airports to exclude deer.

Behavior Modification

This refers to tactics that alter the behavior of wildlife to reduce damage or health threats. Effective behavior modification usually requires integrating two or more auditory scaring or visual scaring techniques.

Auditory scaring techniques

The proper use of frightening devices and harassment techniques including sirens, flashing lights, electronic distress sounds, pyrotechnics, propane exploders, dogs, and rubber projectiles fired from a shotgun could help reduce conflicts (Craven and Hygnstrom 1994). Used in the proper context, these devices can help reduce deer activities near conflict areas. However, electronic guards and propane exploders were ineffective in reducing deer damage to corn (Gilsdorf 2002). Disadvantages of auditory scaring techniques include: 1) they can be labor intensive, 2) disruptive to neighboring landowners/homeowners, and 3) may be cost prohibitive. In addition, frightening methods must be continued indefinitely unless the deer population is reduced or excluded from the resource and new frightening devices will need

to be employed as deer become acclimated to the stimuli. In addition, these devices, at this time, are relatively expensive.

Pyrotechnics. Pyrotechnics are specialized fireworks that are shot from a 12-gauge shotgun or starter's pistol to deter deer or other wildlife. To be successful, pyrotechnics should be carried by wildlife management personnel at all times and used whenever the situation warrants. However, deer will generally only disperse a short distance when pyrotechnics are used as a harassment tool as they become accustomed to the noise (D. Hirschert, WS, pers. comm. 2003).

Propane Cannons. Propane cannons are mechanical devices that use propane gas and an igniter to produce a loud explosive sound. Propane cannons are often suggested as effective frightening agents for deer (Craven and Hygnstrom 1994), and have been used frequently in attempts to reduce crop damage and deer encroachment on airports. Belant et al. (1996) reported that propane cannons which detonated systematically at 8-10 minute intervals were generally ineffective, deterring deer for \leq days. More recent research also indicates that the use of cannons that detonate systematically is ineffective in reducing deer damage to field corn (Gilsdorf 2002). Alternatively, motion-activated cannons which detonate only when deer approach the area to be protected have been shown to be effective at repelling deer for up to 6 weeks (Belant et al. 1996). These devices, however, at this time are relatively expensive.

Visual scaring techniques

Visual techniques, such as use of Mylar tape (highly reflective surface produces flashes of light), eye-spot balloons (the large eyes supposedly give deer a visual cue that a large predator is present), flags, and effigies (scarecrows) sometimes are effective in reducing deer damage in a localized area for a short period of time. Beringer et al. (2003) tested the use of an animal-activated scarecrow and determine that this device may be useful for short-term deterrence of deer from small areas; however the scarecrow became less effective over time. Their device reduced deer damage to soybeans for up to 6 weeks; the device they tested cost an estimated \$1,600.

Lasers light have been tested to disperse deer from crops, but were unsuccessfully as deer did not respond to the lights and leave the area (K. VerCauteren et al. 2003). It is believed that deer may perceive from violet to green in the color spectrum, but may not perceive red and therefore, do not disperse from short or middle wavelength laser light.

Repellents

Repellents have had mixed results in reducing deer damage to shrubs and trees (Palmer et al. 1983, Matschke et al. 1984, Conover 1984, Hygnstrom and Craven 1988, Andelt et al. 1991, Craven and Hygnstrom 1994). Results are generally correlated with deer density, availability of preferred forage plants, alternate food sources, season, and weather. Chemical repellents can be cost prohibitive ranging from \$20/gallon to \$80/gallon.

Repellents require frequent re-application and are often limited in their effectiveness. The effectiveness of a topical repellent is directly related to repellent residue present on the plant.

Rain, heavy dew and watering will remove the residue requiring reapplication of the material. The use of repellents can cause a decrease in native vegetation by shifting browsing pressure from protected plants to native flora. The effectiveness of repellents does decrease as deer densities increase and the availability of preferred deer forage plants decreases.

Population Stabilization through Reproductive Inhibition

Cervids could be sterilized or contraceptives administered to limit their ability to produce offspring. Contraceptive measures for cervids can be grouped into four categories: surgical sterilization, oral contraception, hormone implantation, and immunocontraception (i.e., the use of contraceptive vaccines). Sterilization could be accomplished through surgical sterilization (i.e., vasectomy, castration, and tubal ligation), chemosterilization, and gene therapy. Contraception could be avoided through hormone implantation (i.e., synthetic steroids such as progestins), immunocontraception (i.e., contraceptive vaccines), and oral contraception (i.e., progestin administered daily). These techniques would require that deer receive either single, multiple, or possibly daily treatment to successfully prevent conception.

Use and effectiveness of reproductive control as a wildlife population management tool is limited by population dynamic characteristics (i.e., longevity, age at onset of reproduction, population size and biological/cultural carrying capacity, etc.), habitat and environmental factors (i.e., isolation of target population, cover types and access to target individuals, etc.), socioeconomic and other factors. Population modeling indicates that reproductive control is more efficient than lethal control only for some rodent and small bird species with high reproductive rates and low survival rates (Dolbeer 1998). Additionally, the need to treat a sufficiently large number of target animals, multiple treatments, and population dynamics of free-ranging populations place considerable logistic and economic constraints on the adoption of reproduction control technologies as a wildlife management tool for some species. Research into reproductive control technologies, however, has been ongoing, and the approach will probably be considered in an increasing variety of wildlife management situations.

The use of this method is subject to approval by federal and state agencies and therefore could not be part of any of the action alternatives analyzed in this EA at this time. If a contraceptive measure is proven effective and registered for use in Wisconsin, WS would consider its use as a method under any operational cervid damage management program implemented by WS. However, currently there are many barriers to using reproductive inhibitors in a cervid damage management program. Some of these are:

- it would take a number of years of implementation before the deer population would decline and therefore, damage/threats would continue at the present unacceptable levels for a number of years;
- surgical sterilization would have to be conducted by licensed veterinarians, and would therefore be extremely expensive; and time consuming.

- it is difficult, time-consuming, and expensive to effectively live trap, chemically capture, or remotely treat the number of deer necessary to effect an eventual decline in the population; and
- state and federal regulatory authorities, including the WDNR would have to approve any chemical or biological agents for use as a deer contraceptive in Wisconsin.

LETHAL METHODS²⁵

Shooting

Studies have suggested that localized removal of deer is an effective tool where deer are causing undesirable effects (McNutly et al. 1997, WDNR 2003). This research supports the hypothesis that the removal of a small, localized group would reduce deer densities in that localized area. Bait may be used to attract deer to safe sites for shooting and to enhance success and efficiency. The venison from deer killed by WS would be donated to needy individuals for human consumption, as appropriate.

WS would conduct shooting operations from the ground, elevated stands or vehicles with center-fire rifles during daylight or at night using spotlights and/or night-vision equipment, or from aircraft with shotguns or rifles during daylight hours. Rifles could be equipped with noise suppressors to avoid disturbing the public and to increase the effectiveness of removing deer with this technique. Safe firearm discharge zones would be identified at each collection location. Firearm discharge zones would provide an adequate backstop to prevent a projectile from traveling off site, ricocheting, or traveling in an unknown direction. Topography, motorized vehicles, and/or shooting platforms may potentially be used to achieve a position of relative elevation in comparison to the point of impact when shooting from the ground. Firearms discharge zones would be directed away from buildings, residences, and public roads. Safe firearms discharge zones would be selected on the basis of employee and public safety.

To ensure safe use and awareness, WS employees who use firearms to conduct official duties are required to attend an approved firearms safety and use training program within 3 months of their appointment and a refresher course every 2 years afterwards (WS Directive 2.615). WS employees, who carry firearms as a condition of employment, are required to sign a form certifying that they meet the criteria as set forth in the *Lautenberg Amendment* which prohibits firearm possession by anyone who has been convicted of a misdemeanor crime of domestic violence. Only WS personnel, who have completed firearms safety training, have demonstrated skill and proficiency with the firearms used for deer removal, and have been approved for shooting by the State Director in Wisconsin will participate in shooting activities.

It is the policy of WS management that safety of WS employees and the public is of primary importance when program employees use firearms to accomplish their official duties. Employee use and possession of firearms will be in accordance with applicable federal, state, and local laws and regulations and/or authorized and applicable exemptions. In addition, WS cervid damage

²⁵ All lethal deer removal would be coordinated with the WDNR and/or WDATCP and conducted after necessary permits have been issued to WS or the resource owner/land manager.

management using firearms would be conducted in accordance with WS programmatic firearms use policies, Wisconsin WS firearms use and shooting policies and procedures and WDNR permitting requirements.

Aerial gunning typically involves the shooting from fixed-winged aircraft or helicopters, and is used on all lands where authorized and determined by WS to be an appropriate method. Aerial gunning consists of visually sighting target animals in the target area and shooting them with a shotgun from the aircraft. Shooting results in a relatively quick and humane death. Local damage management problems can often be resolved quickly through aerial gunning by trained and certified WS personnel. All aerial gunning operations are required to comply with WS Directive 2.620 and the WS Aviation Policy Manual, and all aircraft, pilots and aerial gunners will be certified by the WS Aviation Manager.

Good visibility is required for effective and safe aerial gunning operations and relatively clear and stable weather conditions are necessary. Summer conditions limit the effectiveness of aerial gunning as heat reduces activity, and visibility is greatly hampered by vegetative ground cover. High temperatures, which reduce air density, affect low-level flight safety and may further restrict aerial gunning activities.

Live Capture and Euthanasia or Relocation

In some situations it may be appropriate to remove individual or a small number of deer by capture using chemical immobilization, drop nets, rocket nets, Clover traps, box traps, drive/corral traps, etc. Numerous studies have shown that live-capture and relocation of deer is relatively expensive and time-consuming (Ishmael and Rongstad 1984, O'Bryan and McCullough 1985, Diehl 1988, Jones and Witham 1990, Ishmael et al. 1995). Population reduction achieved through capture and relocation is labor intensive and would be costly (i.e., \$273-\$2,876/deer) (O'Bryan and McCullough 1985, Bryant and Ishmael 1991). Additionally, relocation frequently results in high mortality rates for deer (Cromwell et. al. 1999, O'Bryan and McCullough 1985, Jones and Witham 1990, Ishmael et. al. 1995, WDNR 2003). Deer frequently experience physiological trauma during capture and transportation, (capture myopathy) and experience mortality rates ranging from 25-89% within the first year after relocation (Jones and Witham 1990, Mayer et al. 1993). O'Bryan and McCullough (1985) found that only 15% of radio-collared black-tailed deer that were live-captured and relocated from Angel Island, California survived for one year after relocation. Although relocated deer usually do not return to their location of capture, some do settle in familiar suburban habitats and create nuisance problems for those communities (Bryant and Ishmael 1991). High mortality rates of relocated deer, combined with the manner in which many of these animals die, make it difficult to justify relocation as a humane alternative to lethal removal methods (Bryant and Ishmael 1991, WDNR 2003).

Chemical capture methods require specialized training and skill. A primary limitation of immobilizing free-ranging deer is the limited range at which deer can be effectively injected (generally less than 40 yards). Captured cervids would be euthanized using a handgun, a captive bolt gun, a rifle, by chemical means or relocated to a site approved by the WDNR.

The AVMA (1993) states that "...euthanasia is the act of inducing humane death in an animal. Euthanasia techniques should result in rapid unconsciousness followed by cardiac or respiratory arrest and ultimate loss of brain function. In addition, the technique should minimize any stress and anxiety experienced by the animal prior to unconsciousness. Stress may be minimized by technical proficiency and humane handling of the animals to be euthanized." However, when the death of wildlife is necessary, the goal is to minimize pain and suffering of animals, because a distress-free death may not be possible in field operations.

Several WS accepted techniques exist for performing euthanasia on wildlife. These can be grouped as chemical (e.g., barbiturate overdose) and non-chemical methods (e.g., shooting). Although non-chemical methods often are humane and efficient in rural areas, they may not be practical in densely populated areas. In the latter situations, chemical techniques can be more appropriate for euthanizing wildlife.

Chemical Immobilization/Euthanasia Agents. Several chemicals are authorized for immobilization and euthanasia by WS. Selected Wisconsin WS personnel have received training in the safe use of authorized immobilization/euthanasia chemicals and are certified by WS. This training involves hands-on application of state-of-the-art techniques and chemicals. The chemicals that could be used for immobilization or euthanasia include:

Telazol™ and Ketaset™ are the immobilizing agents used by WS, and are approved by the Food and Drug Administration. Telazol and Ketaset are rapid acting, nonnarcotic, nonbarbiturate injectable anesthetic agents, having a wide margin of safety. All three drugs produce unconsciousness known as "dissociative" which in general terms means reflexes needed to sustain life (breathing, coughing, swallowing, etc.) are not affected by the drugs. These agents are used to immobilize live-trapped animals for relocation or are administered before euthanasia. They may also be used in tranquilizer darts fired from a helicopter or from the ground to capture cervids. Beuthanasia-D^R is used by Wisconsin WS as a euthanizing agent when such actions are determined appropriate. As other drugs are approved by the Food and Drug Administration and WS, they could be incorporated into the program within the analysis area.

Telazol is a combination of equal parts of tiletamine hydrochloride and zolazepam hydrochloride. The product is generally supplied sterile in vials, each containing 500 mg of active drug, and when dissolved in sterile water has a pH of 2.2 to 2.8. Telazol produces a state of unconsciousness in which protective reflexes, such as coughing and swallowing, are maintained during anesthesia. Schobert (1987) listed the dosage rates for many wild and exotic animals. Before using Telazol, the size, age, temperament, and health of the animal are considered. Following a deep intramuscular injection of Telazol, onset of anesthetic effect usually occurs within 5 to 12 minutes. Muscle relaxation is optimum for about the first 20 to 25 minutes after the administration, and then diminishes. Recovery varies with the age and physical condition of the animal and the dose of Telazol administered, but usually requires several hours.

Ketaset is supplied as a slightly acidic solution (pH 3.5 to 5.5) for intramuscular injection. Ketaset also produces a state of unconsciousness that interrupts association pathways to the brain and allows for the maintenance of the protective reflexes, such as coughing, breathing, swallowing, and eye blinking. Ketaset is detoxified by the liver and excreted by the kidney. Following administration of recommended doses, animals become immobilized in about 5 minutes with anesthesia lasting from 30 to 45 minutes. Depending on dosage, recovery may be as quick as 4 to 5 hours or may take as long as 24 hours; recovery is generally smooth and uneventful.

Xylazine is a sedative which produces a transitory hypertension followed by prolonged hypotension, and respiratory depression. Recommended dosages are administered through intramuscular injection allowing the animal to become immobilized in about 5 minutes and lasting from 30 to 45 minutes.

Beuthanasia®-D contains two active ingredients (sodium phenytoin and sodium pentobarbital) which are chemically compatible but pharmacologically different. When administered intravenously²⁶, sodium pentobarbital produces rapid anesthetic action followed by a smooth and rapid onset of unconsciousness. When administered intravenously, sodium phenytoin produces toxic signs of cardiovascular collapse and/or central nervous system depression; hypotension occurs when the drug is administered rapidly. Sodium phenytoin exerts its effects during a deep anesthesia stage caused by sodium pentobarbital. Sodium phenytoin, due to its cardiotoxic properties, hastens the stoppage of electrical activity in the heart, causing a cerebral death in conjunction with respiratory arrest and circulatory collapse. Cerebral death occurs prior to the cessation of cardiac activity. This sequence of events leads to a humane, painless and rapid euthanasia (Schering-Plough Animal Health 1999).

Beuthanasia®-D is regulated by the DEA and the FDA for rapid and painless euthanasia of dogs, but legally may be used on other animals if the animal is not intended for human consumption (WS Directive 2.430).

Potassium chloride, a common laboratory chemical, is intravenously injected by WS personnel as a euthanizing agent after an animal has been anesthetized (WS Directive 2.430).

Hunting Programs

Hunting is an effective tool for controlling deer populations in rural and urban or suburban areas, though it may not be acceptable or practical in all urban or suburban settings (Ver Cauteren and Hyngstrom 1998, VerCauteren and Hyngstorm 2002). WS sometimes recommends sport hunting as a damage management method when deer can legally be hunted. A valid hunting license and other licenses or permits may be required by the WDNR. Sport hunting provides recreational opportunities and food for hunters and can be conducted at no or minimal cost to the landowner. Sport hunting is occasionally recommended if it can be conducted safely for damage

²⁶ Intravenous injection is the most rapid, reliable, and desirable euthanasia technique for administering sodium pentobarbital. Intraperitoneal injection may be used when it would cause less distress than intravenous injection (AVMA 1993).

management. Hunters and trappers can provide a societal benefit by reducing those local wild animal populations causing damage.

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APPENDIX C:
WISCONSIN FEDERAL THREATENED AND ENDANGERED SPECIES

To link to Federally listed endangered and threatened animal and plant species:
<http://endangered.fws.gov/wildlife.html#Species>

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APPENDIX D:

WISCONSIN STATE THREATENED AND ENDANGERED SPECIES

For Wisconsin State Endangered and Threatened Mammalian species link to:
<http://www.dnr.state.wi.us/org/land/er/factsheets/mammals.htm>

For Wisconsin State Endangered and Threatened Avian species link to:
<http://www.dnr.state.wi.us/org/land/er/factsheets/birds.htm>

For Wisconsin State Endangered and Threatened Reptile and Amphibian species link to:
<http://www.dnr.state.wi.us/org/land/er/factsheets/herptiles.htm>

For Wisconsin State Endangered and Threatened Fish species link to:
<http://www.dnr.state.wi.us/org/land/er/factsheets/fish.htm>

For Wisconsin State Endangered and Threatened Mussel species link to:
<http://www.dnr.state.wi.us/org/land/er/factsheets/mussels.htm>

For Wisconsin State Endangered and Threatened Reptile and Amphibian species link to:
<http://www.dnr.state.wi.us/org/land/er/factsheets/plants.htm>